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United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States Department of
Agriculture, Forest Service
and Virginia Polytechnic
Institute and
State University

Soil Survey of Giles County Virginia

Southern and Central Parts

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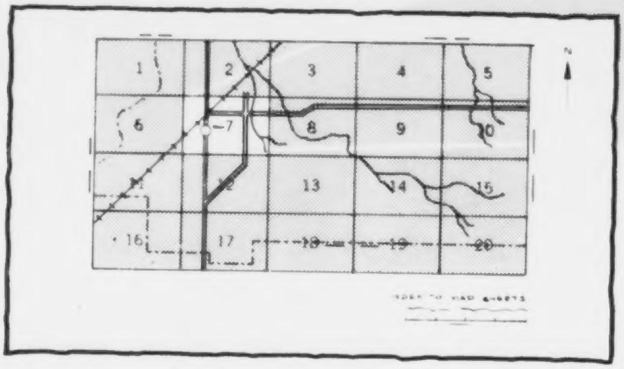
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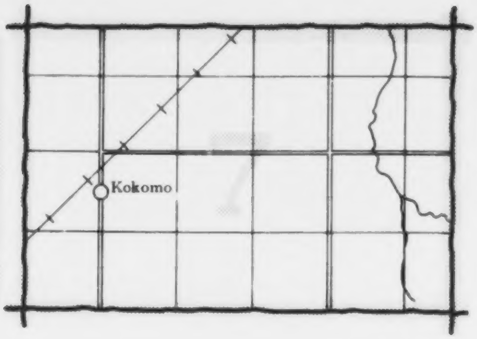

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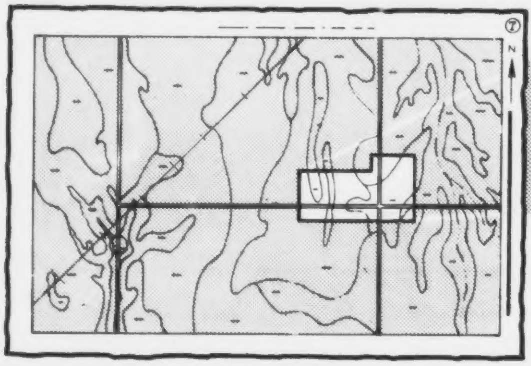

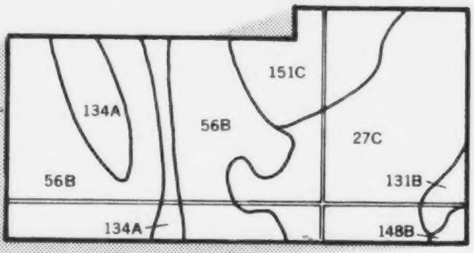
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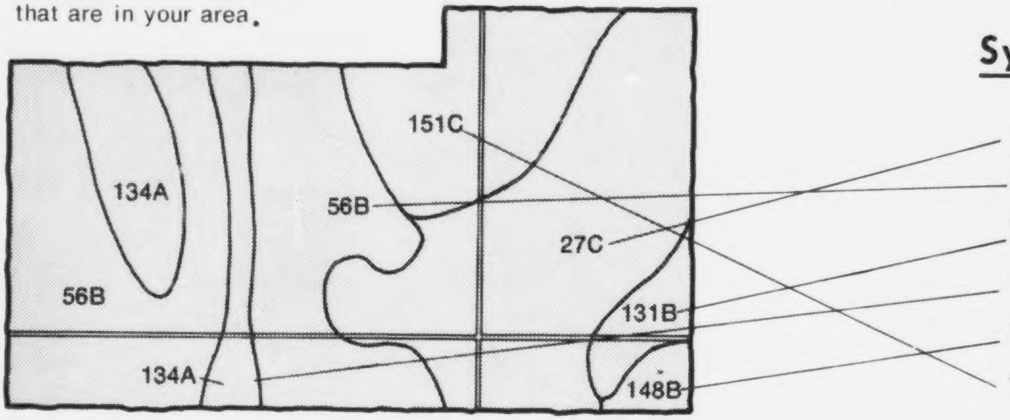
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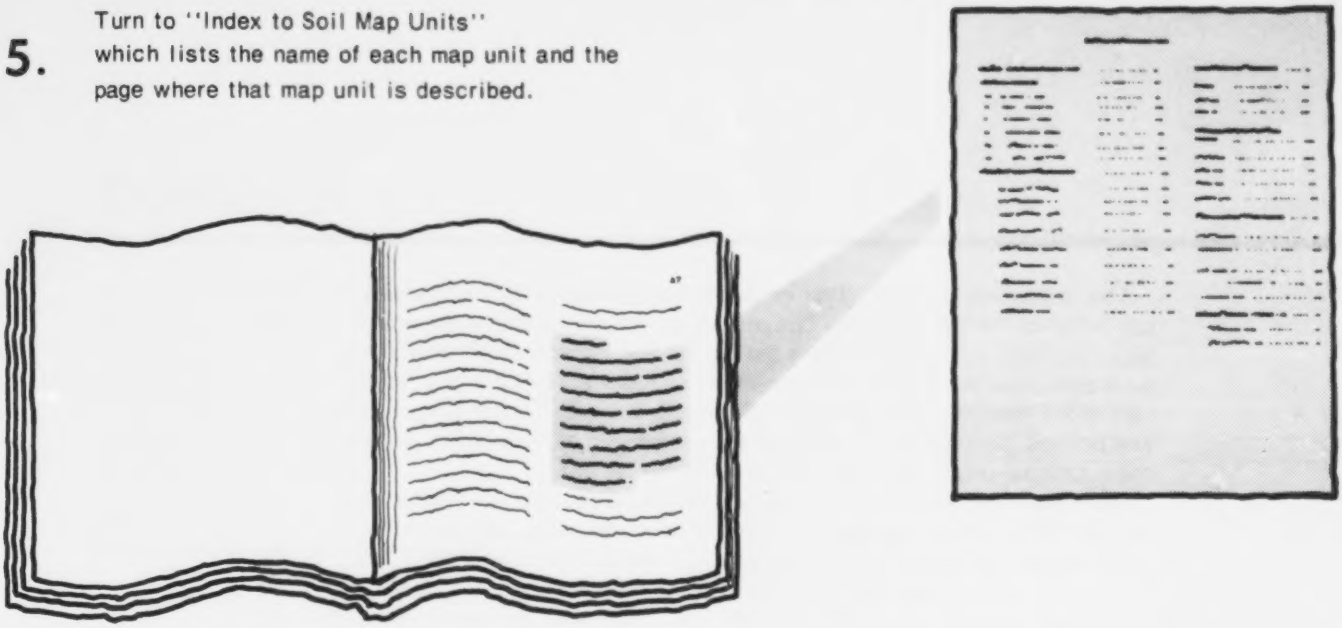
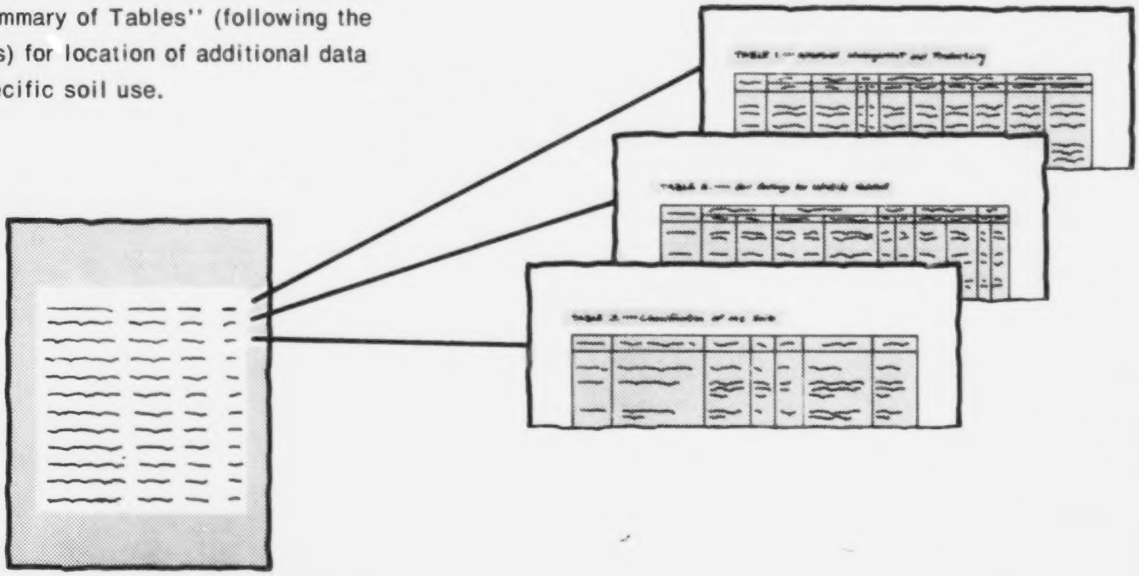
THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981, and soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service, the Virginia Polytechnic Institute and State University, and the Forest Service, United States Department of Agriculture. The survey is part of the technical assistance furnished to the Skyline Soil and Water Conservation District. The survey was financed in part by the Virginia Soil and Water Conservation Commission and the Giles County Board of Supervisors.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: The homestead and cultivated fields are on Frederick cherty silt loam, 7 to 15 percent slopes.

Contents

Index to map units ... iv
Summary of tables ... vi
Foreword ... ix
General nature of the survey area ... 1
How this survey was made ... 2
  Map unit composition ... 3
General soil map units ... 5
Detailed soil map units ... 9
  Soil descriptions ... 9
Prime farmland ... 43
Use and management of the soils ... 45
  Crops and pasture ... 45
  Woodland management and productivity ... 46
  Recreation ... 47
  Wildlife habitat ... 48
  Engineering ... 49
Soil properties ... 55
  Engineering index properties ... 55
  Physical and chemical properties ... 56
  Soil and water features ... 57
Classification of the soils ... 59
Soil series and their morphology ... 59
Formation of the soils ... 73
Processes of horizon development ... 74
References ... 75
Glossary ... 77
Tables ... 85

Soil Series

Allegheny series ... 59
Bailegap series ... 60
Berks series ... 61
Braddock series ... 61
Carbo series ... 62
Chagrin series ... 62
Chagrin Variant ... 63
Chavies Variant ... 63
Cotaco series ... 64
Drall series ... 64
Faywood series ... 65
Fluvaquents ... 65
Frederick series ... 66
Gilpin series ... 66
Jefferson series ... 67
Jefferson Variant ... 67
Lehew series ... 68
Lily series ... 69
Nolichucky series ... 69
Poplimento series ... 70
Sequoia series ... 71
Timberville Variant ... 71
Wallen series ... 72

Issued December 1985

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Index to Map Units

1B—Allegheny loam, 2 to 7 percent slopes 9
1C—Allegheny loam, 7 to 15 percent slopes 10
2D—Berks shaly silt loam, 10 to 30 percent slopes 10
2F—Berks shaly silt loam, 30 to 65 percent slopes 11
3F—Berks very stony silt loam, 30 to 65 percent slopes 11
4B—Braddock sandy loam, 2 to 7 percent slopes 11
4C—Braddock sandy loam, 7 to 15 percent slopes 12
4D—Braddock sandy loam, 15 to 25 percent slopes 12
4E—Braddock sandy loam, 25 to 35 percent slopes 13
5C—Carbo silty clay loam, very rocky, 2 to 15 percent slopes 13
5D—Carbo silty clay loam, very rocky, 15 to 45 percent slopes 14
6F—Carbo-Rock outcrop complex, 25 to 65 percent slopes 14
7—Chagrin silt loam 15
8—Chagrin Variant loamy sand 16
9—Chavies Variant sandy loam 16
10B—Cotaco loam, 2 to 7 percent slopes 16
10C—Cotaco loam, 7 to 15 percent slopes 17
11D—Faywood silt loam, 10 to 30 percent slopes 17
11F—Faywood silt loam, 30 to 65 percent slopes 18
12—Fluvaquents, nearly level 18
13B—Frederick silt loam, 2 to 7 percent slopes 18
13C—Frederick silt loam, 7 to 15 percent slopes 19
13D—Frederick silt loam, 15 to 25 percent slopes 19
13E—Frederick silt loam, 25 to 35 percent slopes 20
14B—Frederick cherty silt loam, 2 to 7 percent slopes 20
14C—Frederick cherty silt loam, 7 to 15 percent slopes 22
14D—Frederick cherty silt loam, 15 to 25 percent slopes 22
14E—Frederick cherty silt loam, 25 to 35 percent slopes 23
15C—Frederick very stony silt loam, 7 to 15 percent slopes 23
15D—Frederick very stony silt loam, 15 to 25 percent slopes 23
15E—Frederick very stony silt loam, 25 to 35 percent slopes 24
16D—Frederick-Rock outcrop complex, 10 to 30 percent slopes 24
16F—Frederick-Rock outcrop complex, 30 to 60 percent slopes 25
17C—Gilpin silt loam, 7 to 15 percent slopes 25
17D—Gilpin silt loam, 15 to 30 percent slopes 26
17F—Gilpin silt loam, 30 to 65 percent slopes 26
18D—Gilpin very stony silt loam, 10 to 30 percent slopes 26
18F—Gilpin very stony silt loam, 30 to 65 percent slopes 27
19C—Jefferson loam, 0 to 15 percent slopes 27
20C—Jefferson very stony loam, 0 to 15 percent slopes 28
20E—Jefferson very stony loam, 15 to 35 percent slopes 28
21C—Jefferson extremely stony loam, 0 to 15 percent slopes 28
21E—Jefferson extremely stony loam, 15 to 35 percent slopes 29
21F—Jefferson extremely stony loam, 35 to 65 percent slopes 29
22D—Jefferson Variant and Drall soils, very stony, 10 to 30 percent slopes 30
22F—Jefferson Variant and Drall soils, very stony, 30 to 65 percent slopes 30
23F—Lehew and Wallen soils, very stony, 35 to 65 percent slopes 31
24C—Lily gravelly sandy loam, 0 to 15 percent slopes 31
24D—Lily gravelly sandy loam, 15 to 35 percent slopes 32
25F—Lily extremely stony sandy loam, 35 to 65 percent slopes 32
26F—Lily gravelly sandy loam, very rocky, 35 to 65 percent slopes 33
27C—Lily-Bailegap complex, very stony, 2 to 15 percent slopes 33
27E—Lily-Bailegap complex, very stony, 15 to 35 percent slopes 34
27F—Lily-Bailegap complex, very stony, 35 to 65 percent slopes 34
28E—Lily-Bailegap complex, extremely stony, 15 to 35 percent slopes 35
29B—Nolichucky loam, 2 to 7 percent slopes 35
29C—Nolichucky loam, 7 to 15 percent slopes 36
29D—Nolichucky loam, 15 to 25 percent slopes 36
30C—Nolichucky very stony sandy loam, 7 to 15 percent slopes 37
30D—Nolichucky very stony sandy loam, 15 to 30 percent slopes 37
30F—Nolichucky very stony sandy loam, 30 to 65 percent slopes 38
31C—Poplimento silt loam, 7 to 15 percent slopes 38
31D—Poplimento silt loam, 15 to 25 percent slopes 39

31E—Poplimento silt loam, 25 to 35 percent slopes . 39
32F—Rock outcrop-Berks complex, 30 to 80 percent slopes 40
33D—Sequoia silt loam, 10 to 30 percent slopes....... 40
33F—Sequoia silt loam, 30 to 65 percent slopes....... 40
34—Slickens, nearly level 41
35B—Timberville Variant loam, 2 to 7 percent slopes........ 41
35C—Timberville Variant loam, 7 to 15 percent slopes........ 41

Summary of Tables

Temperature and precipitation (table 1) 86

Freeze dates in spring and fall (table 2) 87
Probability. Temperature.

Growing season (table 3) 87

Acreage and proportionate extent of the soils (table 4) 88
Acres. Percent.

Prime farmland (table 5) 89

Yields per acre of crops and pasture (table 6) 90
Corn. Corn silage. Alfalfa hay. Kentucky bluegrass. Grass-legume hay. Tall fescue.

Woodland management and productivity (table 7) 93
Ordination symbol. Management concerns. Potential productivity. Trees to plant.

Recreational development (table 8) 100
Camp areas. Picnic areas. Playgrounds. Paths and trails. Golf fairways.

Wildlife habitat (table 9) 105
Potential for habitat elements. Potential as habitat for—Openland wildlife, Woodland wildlife, Wetland wildlife.

Building site development (table 10) 109
Shallow excavations. Dwellings without basements. Dwellings with basements. Small commercial buildings. Local roads and streets. Lawns and landscaping.

Sanitary facilities (table 11) 113
Septic tank absorption fields. Sewage lagoon areas. Trench sanitary landfill. Area sanitary landfill. Daily cover for landfill.

Construction materials (table 12) 117
Roadfill. Sand. Gravel. Topsoil.

Water management (table 13) 122
Limitations for—Pond reservoir areas; Embankments, dikes, and levees; Aquifer-fed excavated ponds. Features affecting—Drainage, Terraces and diversions, Grassed waterways.

Engineering index properties (table 14) 125
Depth. USDA texture. Classification—Unified, AASHTO. Fragments greater than 3 inches. Percentage passing sieve—4, 10, 40, 200. Liquid limit. Plasticity index.

Physical and chemical properties of the soils (table 15) 131
Depth. Clay. Moist bulk density. Permeability. Available water capacity. Reaction. Shrink-swell potential. Erosion factors. Organic matter.

Soil and water features (table 16).. 134
Hydrologic group. Flooding. High water table. Bedrock. Potential frost action. Risk of corrosion.

Classification of the soils (table 17)... 136
Family or higher taxonomic class.

Foreword

This soil survey contains information that can be used in land-planning programs in Giles County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

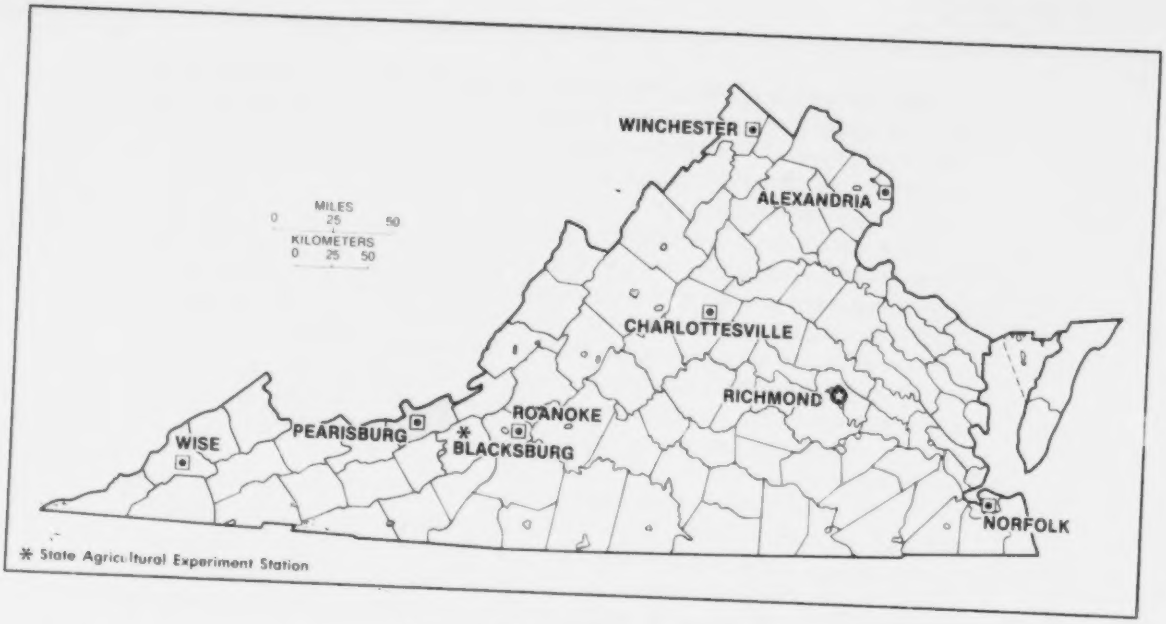
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Manly S. Wilder

Manly S. Wilder
State Conservationist
Soil Conservation Service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KILOMETERS
0 25 50
WINCHESTER
ALEXANDRIA
CHARLOTTESVILLE
RICHMOND
ROANOKE
PEARISBURG
BLACKSBURG
WISE
NORFOLK
* State Agricultural Experiment Station

Location of Giles County in Virginia.

Soil Survey of Giles County, Virginia, Southern and Central Parts

By Paul L. Swecker Jr., P.M. Cauley, John W. Van Dine, and
R.K. Conner, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with
United States Department of Agriculture, Forest Service and
Virginia Polytechnic Institute and State University

Giles County is in the southwestern part of Virginia, about 65 miles west of Roanoke. The county is about 363 square miles, or 232,000 acres. This survey covers the privately owned land, which consists of about 266 square miles, or 170,813 acres. The acreage in the Jefferson National Forest, a 97-square-mile mountainous area in the northern and western parts of the county, is not covered in this survey.

The soils in the county formed in material weathered from shale, limestone, siltstone, or sandstone. Most of the soils, with the exception of those on the steeper ridges and mountain slopes, are suited to a variety of farm and nonfarm use. Woodland makes up about 73 percent of the county and is mainly on moderately steep to very steep slopes.

U.S. Route 460 and Virginia Routes 42, 61, and 100 are the major routes in the county. The New River Valley Airport near Dublin provides some passenger service, and one railroad in the county provides freight transportation.

General Nature of the Survey Area

This section provides general information about some of the cultural and natural factors that affect land use in the county.

History and Population

Giles County was formed in 1806 from parts of Montgomery and Tazewell Counties in Virginia and Monroe County in West Virginia.

The first settlement was in the northern part of the county in the New River Valley, near what is now Glen Lyn. Giles County first comprised a territory of about 100 miles by 30 miles. The boundary lines of the county have been changed four times since its formation, reducing the area to approximately 363 square miles.

The town of Pearisburg was formed at the junction of U.S. Route 460 and Virginia Route 100. Pearisburg was incorporated and became the county seat in 1914. Narrows and Pearisburg are the largest towns in the county.

The 1970 population of Giles County was 16,741, and the 1980 population is listed as 17,810.

Physiography, Relief, and Drainage

Giles County is entirely within the major land resource area called the Southern Appalachian Ridges and Valleys (*5*). The County is largely mountainous, and the major valleys are parallel to the New River, which cuts through the central part, and to its tributaries, Wolf Creek, Walker Creek, Sinking Creek, and Stony Creek. The river is the main drainage outlet and flows northwest to the Ohio River. The mountains mainly are sandstone and shale. The valley uplands throughout the county formed in residuum from limestone or shale, and in colluvial material from the surrounding mountains. The elevation of the county ranges generally from 1,500 to 4,400 feet above sea level.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Blacksburg, Virginia, in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 32 degrees F, and the average daily minimum temperature is 22 degrees. In summer the average temperature is 69 degrees, and the average daily maximum temperature is 78 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 40 inches. Of this, 20 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 12.5 inches. The heaviest 1-day rainfall during the period of record was 3.8 inches at Blacksburg on June 17, 1976. Thunderstorms occur on about 40 days each year, and most occur in summer.

The average seasonal snowfall is 24 inches. The greatest snow depth at any one time during the period of record was 35 inches. On an average of 25 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southeast. Average windspeed is highest, 10 miles per hour, in winter.

How This Survey was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind or segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or model of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another resulting in gradual changes in characteristics. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation to precisely define and locate the soils is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

In some instances, the names of the soils and the boundaries of the map do not match those on the maps of the adjacent counties. The differences exist because of differences in the detail of mapping, changes in soil classification, and different proportions of the same soil in different counties. Where the names of the adjacent soils are different, the properties and characteristics of the soils are similar.

Soils on Mountains and Mountain Foot Slopes; Formed in Residuum Weathered from Shale or Sandstone or in Colluvial Material Weathered from Shale or Sandstone

1. Gilpin-Lehew-Wallen

Strongly sloping to very steep, somewhat excessively drained and well drained, moderately deep soils with a loamy subsoil; on mountains and high ridges

This unit makes up 6 percent of the survey area and is one of the most mountainous in the survey area. It is mostly on narrow, undulating ridges and long, steep, convex side slopes. Deep, parallel, V-shaped drainageways dissect most areas, and most areas have stones on the surface.

Well drained, strongly sloping to very steep Gilpin soils make up about 39 percent of the unit. They are on the lower parts of side slopes, at a lower elevation than Lehew and Wallen soils. Gilpin soils formed in the weathered products of shale and are moderately deep to bedrock.

Well drained, steep or very steep Lehew soils make up about 27 percent of the unit. They are on the upper parts of side slopes, at a lower elevation than Wallen soils and a higher elevation than Gilpin soils. They formed in the weathered products of reddish brown sandstone and are moderately deep to bedrock.

Somewhat excessively drained, steep or very steep Wallen soils make up about 18 percent of the unit. They are on mountaintops and crests of side slopes at a higher elevation than Lehew soils. They formed in the weathered products of sandstone and are moderately deep to bedrock.

Minor soils make up about 16 percent of the unit. They consist of very deep, well drained Nolichucky soils on benches; very deep, well drained Jefferson Variant soils and deep, excessively drained Drall soils in drainageways and other concave positions; moderately deep, well drained Berks soils on side slopes; and rock escarpments on mountaintops.

Most areas of this unit are too stony, too steep, or too rocky for farming. They are mostly wooded. Some areas with few stones on the surface and with slopes of less than 30 percent, mostly Gilpin soils, are used for pasture and hay.

The depth to bedrock, slope, and the stones on the surface limit the soils in this unit for most nonfarm uses. The erosion hazard is very severe in disturbed areas and areas with no plant cover.

2. Jefferson Variant-Drall

Strongly sloping to very steep, well drained and excessively drained, deep soils with a loamy or sandy subsoil; on mountain side slopes and ridges

This unit makes up about 3 percent of the survey area. It is mostly on long ridges with steep and very steep, smooth, convex side slopes and moderately steep, narrow tops. Deep, parallel, V-shaped drainageways dissect most areas, and most areas have stones on the surface.

Well drained, strongly sloping to very steep Jefferson Variant soils make up about 39 percent of the unit. These soils formed mainly in colluvium from sandstone. They are in drainageways, on benches, and in concave positions. They have a loamy subsoil that is as much as 30 percent rock fragments.

Excessively drained, strongly sloping to very steep Drall soils make up about 32 percent of the unit. These soils formed in the weathered products of sandstone residuum and colluvium. They are on convex side slopes and ridgetops and have a sandy subsoil that is 30 to 65 percent rock fragments.

Minor soils make up about 29 percent of this unit. They consist of well drained, moderately deep Gilpin soils on convex side slopes; very deep, well drained Nolichucky soils on benches and foot slopes; and moderately deep, well drained Lehew soils and moderately deep, somewhat excessively drained Wallen soils on mountaintops.

Most areas of this map unit are wooded and are too steep or too stony for farming. Some areas with few stones on the surface and with slopes of less than 30 percent, mostly Gilpin and Nolichucky soils, are used for pasture and hay.

Slope and the stones on the surface limit the soils in this unit for most nonfarm uses. The erosion hazard is very severe in disturbed areas and areas with no plant cover.

3. Gilpin-Berks

Strongly sloping to very steep, well drained, moderately deep soils with a loamy subsoil; on ridges and side slopes

This unit makes up about 4 percent of the survey area. It is mostly made up of smooth ridges with broad, rolling tops and steep or very steep side slopes. Numerous V-shaped drainageways dissect the area in dendritic and parallel patterns.

Gilpin soils make up about 45 percent of the unit. They formed in the weathered products of shale. Many areas on the steep or very steep side slopes have stones on the surface.

Berks soils make up about 43 percent of the unit. They formed in the weathered products of shale and sandstone.

Minor soils make up 12 percent of the unit. They consist of very deep, moderately well drained Cotaco soils on high terraces and bedrock escarpments along the New River.

Most of the steep and very steep areas and the areas with stones on the surface are wooded. Most of the strongly sloping and moderately steep areas are used for and suited to pasture and hay. Some sloping areas are cultivated, but droughtiness in summer and an erosion hazard make these soils poorly suited to cultivated crops.

Slope and depth to bedrock limit this unit for most nonfarm uses. The erosion hazard is very severe in disturbed areas and areas with no plant cover.

4. Lily-Bailegap-Jefferson

Nearly level to very steep, well drained, moderately deep to very deep soils with a loamy subsoil; on ridgetops, side slopes, and foot slopes

This unit makes up about 8 percent of the survey area. It is mostly made up of high mountains with broad, sloping or moderately steep tops and steep or very steep side slopes. Long and deep, V-shaped, parallel drainageways dissect most side slopes. Most areas have stones on the surface.

Nearly level to very steep Lily soils make up about 42 percent of the unit. They formed in residuum weathered from sandstone, siltstone, and interbedded shale. They are dominantly on ridgetops, side slopes, and rounded hills and are moderately deep to bedrock.

Nearly level to very steep Bailegap soils make up 28 percent of the unit. They formed in residuum weathered from sandstone, siltstone, and interbedded shale. They are dominantly on ridgetops, side slopes, and rounded hills and are deep to bedrock.

Nearly level to very steep Jefferson soils make up about 13 percent of the unit. They formed in colluvium from soils formed in residuum of acid sandstone, shale, and siltstone. They are dominantly on steep mountain side slopes and foot slopes commonly below sandstone escarpments and very deep to bedrock.

Minor soils make up about 17 percent of the unit. They consist of moderately deep, well drained Lehew soils; moderately deep, somewhat excessively drained Wallen soils on ridgetops and side slopes; and very deep, well drained Nolichucky soils in drainageways and on side slopes.

Most areas of this unit are wooded; they generally are too steep and too stony for most other uses. A few small areas have been cleared and are used for hunting lodges and campsites. Mountain Lake, the highest natural lake east of the Rocky Mountains, is in this unit.

Soils on Mountain Foot Slopes; Formed in Colluvium, Alluvium on High Terraces, or Residuum Weathered from Limestone

5. Nolichucky-Frederick-Carbo

Gently sloping to very steep, well drained, very deep or moderately deep soils with a loamy or clayey subsoil; on foot slopes and low hills

This unit makes up 45 percent of the survey area. It is mostly made up of rolling or hilly uplands in valleys below high, very steep mountains. Deep, V-shaped, parallel drainageways dissect most areas.

Gently sloping to very steep Nolichucky soils make up about 50 percent of the unit. They formed in colluvium from sandstone, shale, and limestone and are on foot slopes above Frederick soils. Most areas of these soils have stones on the surface. The soils have a loamy subsoil and are very deep to bedrock.

Gently sloping to steep Frederick soils make up about 35 percent of the unit. They formed in the weathered products of limestone or dolomite and are on low hills and foot slopes below Nolichucky soils. Most areas of these soils have stones on the surface. The soils have a clayey subsoil and are very deep to bedrock.

Gently sloping to very steep Carbo soils make up about 7 percent of the unit. They formed in the weathered products of limestone and are on low hills and foot slopes below Nolichucky soils. They have a clayey subsoil and are moderately deep to bedrock.

The remaining 8 percent of the unit is made up of minor soils. They consist of very deep, well drained Timberville Variant soils; Chavies Variant, Chagrin, and Allegheny soils on terraces and flood plains; very deep, well drained Jefferson Variant soils and deep, excessively drained Drall soils in drainageways and other concave positions; and moderately deep, well drained Berks soils on side slopes.

Though many areas of this unit have been cleared for farming or nonfarm purposes, some areas still are wooded and are too steep, too stony, or too rocky for most other uses. Some areas of Carbo soils that have few stones and rock outcrops on the surface and with slopes of less than 30 percent are used for pasture. The Frederick soils and some areas of Nolichucky soils with slopes of less than 25 percent are suited to cultivated crops such as corn. The areas of those soils with slopes of more than 25 percent are used for hay and pasture. The Nolichucky soils that have stones on the surface are used for pasture crops where it is practical to use farm machinery.

Slope, depth to bedrock, stones on the surface, low strength, and moderate to slow permeability are the main limitations of the soils in this unit for most nonfarm uses. The erosion hazard is very severe in disturbed areas and areas with no plant cover.

6. Braddock

Gently sloping to steep, well drained, deep soils with a clayey subsoil; on high terrace uplands

This unit makes up 6 percent of the survey area. It is mostly made up of high river terraces with gently sloping or sloping tops and moderately steep or steep side slopes. Drainageways dissect most areas in a dendritic pattern.

Braddock soils make up about 55 percent of the unit. They formed in alluvium and are mainly on the higher terrace positions.

Minor soils make up about 45 percent of this map unit. They consist of moderately well drained Cotaco soils, well drained Allegheny soils, and well drained Chavies Variant soils, all of which are very deep and on lower terraces, and very deep, excessively drained Chagrin Variant soils on flood plains.

Most areas of this unit have been cleared for farming or nonfarm purposes. Some areas still are wooded and are so steep or have so many cobblestones in the surface layer that their suitability for other uses is poor. Areas with slopes of less than 15 percent are used mainly for cultivated crops such as corn. Areas with slopes of between 15 and 25 percent are mainly used for pasture or are wooded and are well suited to those uses.

Permeability, low strength, and slope limit this unit for nonfarm use. The erosion hazard is very severe in disturbed areas and areas with no plant cover.

Soils on Valley Uplands; Formed in Residuum Weathered from Shale or Limestone

7. Faywood-Poplimento-Sequoia

Strongly sloping to very steep, well drained, moderately deep and very deep soils with a clayey subsoil; on hills, ridges, and side slopes

This unit makes up about 4 percent of the survey area. It is mostly made up of narrow, rounded ridges and hills with steep or very steep side slopes. Long and narrow, deep, V-shaped, parallel drainageways dissect the area.

Strongly sloping to very steep Faywood soils make up about 23 percent of the unit. They are in areas underlain by interbedded limestone and shale and are moderately deep to bedrock.

Strongly sloping to steep Poplimento soils make up about 22 percent of the unit. They are in areas underlain by limestone and shale and are very deep to bedrock.

Strongly sloping to very steep Sequoia soils make up about 14 percent of the unit. They are in areas underlain by interbedded shale and limestone and are moderately deep to bedrock.

Minor soils make up about 41 percent of the unit. They consist of very deep, well drained Nolichucky soils on benches and foot slopes; very deep, well drained Jefferson Variant soils and deep, excessively drained Drall soils in drainageways; and moderately deep, well drained Gilpin soils on side slopes and ridgetops.

Most areas of this unit with slopes of less than 30 percent are used for hay and pasture and are suited to those uses. Most areas with slopes of more than 30 percent are in and suited to woodland.

Slope, depth to bedrock, low strength, and moderately slow permeability limit the soils in this unit for most nonfarm uses. The erosion hazard is very severe in disturbed areas and areas with no plant cover.

8. Frederick-Carbo

Gently sloping to very steep, well drained, very deep or moderately deep soils with a clayey subsoil; on limestone uplands

This unit makes up about 24 percent of the survey area. It is mostly on rolling or hilly uplands dissected by dendritic drainageways. Sinkholes are common throughout the unit.

Gently sloping to steep Frederick soils make up about 65 percent of the unit. They formed in the weathered products of limestone, dolomite, or interbedded sandstone and dolomite and are very deep to bedrock. Most areas have stones on the surface.

Gently sloping to very steep Carbo soils make up about 10 percent of the unit. They formed in the weathered products of limestone and are moderately deep to bedrock. The Carbo soils are dotted by small areas of rock outcrop, and many areas are covered by a dense growth of eastern red-cedar.

Minor soils make up about 25 percent of the unit. They consist of very deep, well drained Allegheny, Chavies Variant, Chagrin, and Timberville Variant soils, all on terraces and flood plains.

Most of this map unit is farmed or used for nonfarm development. Some areas still are wooded and are too steep, too stony, or too rocky for other uses. The Frederick soils with slopes of less than 25 percent are suited to cultivated crops such as corn. The areas with slopes of more than 25 percent are used for hay and pasture and are suited to those uses. Most areas of Carbo soils that have been cleared are used for pasture where it is practical to use farm machinery.

Slope, low strength, and permeability limit the Frederick soils for nonfarm use. Slow permeability, a high shrink-swell potential, low strength, and the depth to bedrock limit the Carbo soils for nonfarm use. The erosion hazard is very severe in disturbed areas and areas with no plant cover.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Frederick silt loam, 2 to 7 percent slopes, is one of several phases in the Frederick series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Lily-Bailegap complex, very stony, 15 to 35 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Lehew and Wallen soils, very stony, 35 to 65 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Slickens, nearly level, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

1B—Allegheny loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on low terraces. The areas commonly are long and narrow and range from 3 to 20 acres. They are subject to rare flooding.

Typically, the surface layer is brown loam 7 inches thick. The subsoil is 32 inches thick. The upper 6 inches of the subsoil is strong brown sandy clay loam. The lower 26 inches is strong brown clay loam. The substratum is strong brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are a few widely scattered, 3- to 5-acre areas that have a surface layer of cobbly loam and a yellowish red subsoil. Also included are a few 3- to 7-acre areas with slopes of less than 2 percent and few areas that are generally less than 3 acres each and that have a surface layer of fine sandy loam or gravelly loam. Included soils make up 10 to 15 percent of the unit.

The permeability of this Allegheny soil is moderate, and the available water capacity is moderate. Surface runoff is slow to medium. The surface layer is low or moderate in organic matter content, and natural fertility is low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has low shrink-swell potential.

Most of the acreage of this soil is cultivated, and the soil is classified as prime farmland in this county.

This soil is well suited to cultivated crops commonly grown in the area, but the erosion hazard is moderate in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture level also are practices that help to maintain tilth. The included areas of soils that have slopes of less than 2 percent have a slight erosion hazard.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and black walnut. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Flooding is the main limitation of the soil for nonfarm uses. Stockpiling topsoil, reseeding, and use of sediment basins are practices that help to control erosion at construction sites.

The capability subclass is IIe.

1C—Allegheny loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on low terraces. The areas typically are long and narrow and in some places are slightly concave. They range from 3 to 8 acres.

Typically, the surface layer is brown loam 7 inches thick. The subsoil is 32 inches thick. The upper 6 inches of the subsoil is strong brown sandy clay loam. The lower 26 inches is strong brown clay loam. The substratum is strong brown clay loam to a depth of 60 inches or more.

Included with this soil in mapping are a few areas with slopes of less than 7 percent and a few areas of soils with a surface layer of gravelly loam or sandy loam. The areas of included soils are about 2 to 3 acres each and make up about 5 percent of this unit.

The permeability of this Allegheny soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The surface layer is low or moderate in organic matter content, and natural fertility is low. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has low shrink-swell potential.

Most of the acreage of this soil is cultivated.

This soil is moderately well suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture level also are practices that help to maintain tilth. The included areas of soils that have slopes of less than 7 percent have a moderate erosion hazard.

This soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope is a limitation of the soil for most nonfarm uses. Stockpiling topsoil, reseeding, and use of sediment basins are practices that help to control erosion at construction sites.

The capability subclass is IIIe.

2D—Berks shaly silt loam, 10 to 30 percent slopes. This soil is moderately deep, well drained, and strongly sloping to steep. It is on mountain ridges in long, narrow areas that range from 10 to 100 acres.

Typically, the surface layer is very dark grayish brown shaly silt loam 2 inches thick. The subsoil is 16 inches thick. The upper 6 inches of the subsoil is yellowish brown shaly silt loam. The lower 10 inches is reddish yellow very shaly silt loam. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Shale bedrock and fine-grained sandstone bedrock are at a depth of 23 inches.

Included with this soil in mapping are a few small areas where the depth to bedrock is less than 20 inches. Also included are a few small areas of Gilpin soils and soils that have a surface layer of very shaly silt loam. Included areas make up 5 to 10 percent of the unit.

The permeability of this Berks soil is moderate or moderately rapid, and the available water capacity is very low. Surface runoff is medium to rapid. The surface layer is low to moderate in content of organic matter, and the soil is low in natural fertility. The rooting zone and depth to bedrock range from 20 to 30 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has a low shrink-swell potential.

Most areas of this soil are in woodland. A few areas are in permanent pasture or hay.

Slope makes this soil generally unsuited to cultivated crops, but some areas are suited to permanent pasture and hay. The hazard of erosion is severe in cultivated areas and in areas with no plant cover.

The potential productivity for trees on this soil is moderately high on the north-facing slopes and moderate on the south-facing slopes. The soil is managed primarily for oaks, hickory, and Virginia pine. Droughtiness causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce the concentration of runoff and control erosion. Slope limits the operation of heavy timber equipment.

Slope and the depth to bedrock are the main limitations of the soil for most nonfarm uses.

The capability subclass is VIe.

2F—Berks shaly silt loam, 30 to 65 percent slopes. This soil is moderately deep, well drained, and steep to very steep. It is in irregularly shaped areas on the side slopes of high ridges and mountains. The areas range from 15 to 50 acres.

Typically, the surface layer is very dark grayish brown shaly silt loam 2 inches thick. The subsoil is 16 inches thick. The upper 6 inches of the subsoil is yellowish brown shaly silt loam. The lower 10 inches is reddish yellow very shaly silt loam. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Shale bedrock and fine-grained sandstone bedrock are at a depth of 23 inches.

Included with this soil in mapping are a few small areas where the depth to bedrock is less than 20 inches. Also included are a few small areas of Gilpin soils and soils that have a surface layer of very shaly silt loam. Included areas make up 5 to 10 percent of the unit.

The permeability of this Berks soil is moderate or moderately rapid, and the available water capacity is very low. Surface runoff is rapid. The surface layer is low to moderate in content of organic matter, and the soil is low in natural fertility. The rooting zone and depth to bedrock range from 20 to 30 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has a low shrink-swell potential.

Most of the acreage of this soil is in woodland.

Slope makes this soil generally unsuited to farming. Some cleared areas are suitable for native pasture. The erosion hazard is very severe in cultivated areas and in areas with no plant cover.

The potential productivity for trees on this soil is moderately high on the north-facing slopes and moderate on the south-facing slopes. The soil is managed primarily for oaks, hickory, and Virginia pine. Droughtiness causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour help to reduce the concentration of runoff and control erosion. Slope limits the operation of heavy timber equipment.

Slope, the depth to bedrock, and the inaccessible location are major limitations of this soil for nonfarm use.

The capability subclass is VIIe.

3F—Berks very stony silt loam, 30 to 65 percent slopes. This soil is moderately deep, well drained, and steep to very steep. It is on the side slopes of mountain ridges in irregularly shaped areas that range from 20 to 50 acres. Large stones cover 3 to 15 percent of the surface.

Typically, the surface layer is very dark grayish brown shaly silt loam 2 inches thick. The subsoil is 16 inches thick. The upper 6 inches of the subsoil is yellowish brown shaly silt loam. The lower 10 inches is reddish yellow very shaly silt loam. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Shale bedrock and fine-grained sandstone bedrock are at a depth of 23 inches.

Included with this soil in mapping are a few small areas where the depth to bedrock is less than 20 inches and a few small areas of Gilpin soils. Also included are areas of soils with slopes of 10 to 30 percent and soils that have a surface layer of sandy loam. Included areas make up about 5 to 10 percent of the unit.

The permeability of this Berks soil is moderate or moderately rapid, and the available water capacity is very low. Surface runoff is medium to rapid. The surface layer is low to moderate in content of organic matter, and the soil is low in natural fertility. The rooting zone and depth to bedrock range from 20 to 30 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has a low shrink-swell potential.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is very severe in areas with no plant cover.

The potential productivity for trees on this soil is moderately high on north-facing slopes and moderate on south-facing slopes. Most areas are wooded, and the soil is managed primarily for oaks, hickory, and Virginia pine. Droughtiness causes a high rate of seedling mortality, particularly on the south-facing slopes. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope and the stones on the surface of the soil limit operation of heavy timber equipment.

Slope, the stones on the surface, and the depth to bedrock are major limitations of the soil for nonfarm use.

The capability subclass is VIIs.

4B—Braddock sandy loam, 2 to 7 percent slopes. This soil is very deep, well drained, and gently sloping. It is on high terraces near the New River and other streams. It is generally in irregularly shaped areas that range from 5 to 15 acres. In some areas slopes are complex and undulating.

Typically, the surface layer is dark brown sandy loam about 6 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches is yellowish red clay loam. The lower part is red clay and clay loam.

Included with this soil in mapping are small areas of soils that have a surface layer of gravelly or cobbly sandy loam. Included soils make up about 10 to 15 percent of the unit.

The permeability of this Braddock soil is moderate, and the available water capacity is moderate or high. Surface runoff is medium. The surface layer is low in content of organic matter, and the soil is low in natural fertility. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has a moderate shrink-swell potential.

Most of this soil is in cultivated crops or pasture, and the soil is classified as prime farmland in this county.

This soil is well suited to cultivated crops commonly grown in the area, but the erosion hazard is moderate in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture level also are practices that help to maintain tilth.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture on this soil is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled.

The permeability, the clayey subsoil, and low strength are the main limitations of the soil for community development.

The capability subclass is IIe.

4C—Braddock sandy loam, 7 to 15 percent slopes. This soil is very deep, well drained, and strongly sloping. It is on high terraces near the New River and other streams. It is generally in irregularly shaped areas that range from 5 to 14 acres. In some areas slopes are complex and undulating.

Typically, the surface layer is dark brown sandy loam about 6 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches is yellowish red clay loam. The lower part is red clay and clay loam.

Included with this soil in mapping are small areas of soils that have a surface layer of gravelly or cobbly sandy loam, small areas of severely eroded soils, and small areas of Nolichucky soils. Included soils make up about 10 to 15 percent of the unit.

The permeability of this Braddock soil is moderate, and the available water capacity is moderate or high. Surface runoff is medium. The surface layer is low in content of organic matter, and the soil is low in natural fertility. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has a moderate shrink-swell potential.

Most of the acreage of this soil is farmed for cultivated crops, and a smaller acreage is in pasture and hay.

This soil is suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture level also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture on this soil is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope, permeability, and the clayey texture of the subsoil are the main limitations of the soil for nonfarm use.

The capability subclass is IIIe.

4D—Braddock sandy loam, 15 to 25 percent slopes. This soil is very deep, well drained, and moderately steep. It is on high terraces near the New River and other streams. It is generally in irregularly shaped areas that range from 5 to 15 acres and that commonly are dissected by drainageways. In some areas slopes are complex and undulating.

Typically, the surface layer is dark brown sandy loam about 6 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches is yellowish red clay loam. The lower part is red clay and clay loam.

Included with this soil in mapping are small areas of soils that have a surface layer of gravelly or cobbly sandy loam and small areas of severely eroded soils.

Included soils make up about 10 to 15 percent of the unit.

The permeability of this Braddock soil is moderate, and the available water capacity is moderate or high. Surface runoff is rapid. The surface layer is low in content of organic matter, and the soil is low in natural fertility. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has moderate shrink-swell potential.

Most acreage of this soil is in pasture. The remaining acreage is in woodland.

Slope makes this soil poorly suited to cultivated crops commonly grown in the county. The hazard of erosion is severe. Incorporating organic matter into the soil and plowing when the soil is at proper moisture content are practices that maintain and improve tilth. Conservation tillage, use of crop residue, use of cover crops and grasses and legumes in the cropping system, and contour stripcropping are practices that help to reduce runoff and control erosion in cultivated areas.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. The soil is managed primarily for white pine and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, limiting the use of heavy timber equipment. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope and the clayey subsoil are the main limitations of the soil for community development. Establishing a plant cover in excavated areas is difficult because of the slope.

The capability subclass is IVe.

4E—Braddock sandy loam, 25 to 35 percent slopes. This soil is very deep, well drained, and steep. It is commonly in irregularly shaped areas that range from 5 to 15 acres. The areas are on high terraces near the New River and other streams. Shallow drainageways are common on this soil.

Typically, the surface layer is dark brown sandy loam about 6 inches thick. The subsurface layer is yellowish brown sandy loam 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches is yellowish red clay loam. The lower part is red clay and clay loam.

Included with this soil in mapping are small areas that have stones on the surface and small severely eroded areas. Included areas make up about 10 to 15 percent of the unit.

The permeability of this Braddock soil is moderate, and the available water capacity is moderate or high. Surface runoff is very rapid. The surface layer is low in content of organic matter, and the soil is low in natural fertility. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid. The subsoil has moderate shrink-swell potential.

Most of the acreage of this soil is in permanent pasture or woodland.

Slope makes this soil poorly suited to cultivated crops commonly grown in the county. The hazard of erosion is severe in areas that are cultivated and in areas with no plant cover.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. This soil is managed primarily for eastern white pine and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet, thus limiting the use of heavy timber equipment, and slope further limits the operation of equipment. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope and the clayey subsoil are the main limitations of the soil for community development. Establishing a plant cover in excavated areas is difficult because of the slope.

The capability subclass is VIe.

5C—Carbo silty clay loam, very rocky, 2 to 15 percent slopes. This soil is gently sloping to strongly sloping, moderately deep, and well drained. It is on ridgetops and side slopes and in broad depressional areas. The areas are irregularly shaped and range from 5 to 20 acres. Rock outcrop covers 5 to 10 percent of the surface area, and sinkholes are common in some areas.

Typically, the surface layer is brown silty clay loam 5 inches thick. The subsoil is strong brown clay 20 inches thick. Hard limestone bedrock is at a depth of 25 inches.

Included with this soil in mapping are small areas, mainly less than 5 acres each, that are less than 5 percent rock outcrop or are up to 45 percent rock outcrop or that are severely eroded. Also included are areas of Timberville Variant soils, mainly less than 1 acre each, in sinkholes and drainageways. Included soils make up about 5 to 10 percent of the unit.

The permeability of this Carbo soil is slow. The available water capacity is low. Surface runoff is medium to rapid. The surface layer is low to moderate in content of organic matter, and natural fertility is high. The soil is slightly acid or neutral. The subsoil has a high shrink-swell potential. The rooting zone and the depth to bedrock range from 20 to 40 inches.

Most areas of this soil are in permanent pasture or woodland. A few areas are in cultivated crops.

This soil is poorly suited to cultivated crops and to hay and pasture. The rock outcrops limit the types of farm machinery that can be used on this soil, making plowing and disking difficult or impractical. The surface layer compacts easily if the pasture is grazed when the soil is wet. This and overgrazing increase surface runoff and erosion. The use of proper stocking rates, rotational and deferred grazing, and the use of fertilizer are the main pasture management practices.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for oaks, yellow-poplar, and eastern white pine. Droughtiness during the growing season causes a high rate of seedling mortality, and the rock outcrop restricts the use of some types of harvesting or planting equipment.

The depth of bedrock, the slow permeability, and the high shrink-swell potential are the main limitations of the soil for nonfarm use. Fractures and caverns in the limestone bedrock cause a hazard of ground-water pollution in areas used as sites for septic systems.

The capability subclass is IVs.

5D—Carbo silty clay loam, very rocky, 15 to 45 percent slopes. This soil is moderately deep, well drained, and moderately steep to very steep. It is commonly in irregularly shaped areas on side slopes of low ridges. The areas range from 15 to 50 acres. Rock outcrop covers about 10 percent of the surface area, and sinkholes are common in some areas.

Typically, the surface layer is brown silty clay loam 5 inches thick. The subsoil is strong brown clay 20 inches thick. Hard limestone bedrock is at a depth of 25 inches.

Included with this soil in mapping are small severely eroded areas, small areas that are less than 20 inches deep to limestone bedrock, and small areas that are less than 5 percent rock outcrop or up to 45 percent rock outcrop. Included areas make up about 5 to 10 percent of the unit.

The permeability of this Carbo soil is slow. The available water capacity is low. Surface runoff is rapid to very rapid. The surface layer is low to moderate in content of organic matter, and natural fertility is high. The soil is slightly acid or neutral. The subsoil has a high shrink-swell potential. The rooting zone and the depth to bedrock range from 20 to 40 inches.

Most areas of the soil are in woodland. A few areas are in permanent pasture (fig. 1).

Slope and the rock outcrops make this soil generally unsuited to cultivated crops. The soil is suited to permanent pasture. The rock outcrops limit the types of farm machinery that can be used on this soil, making plowing and disking difficult or impractical. The surface layer of this soil compacts easily if the pasture is grazed when the soil is wet. This and overgrazing increase runoff and erosion. The use of proper stocking rates, rotational and deferred grazing, and the use of fertilizer are the main pasture management practices.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for oaks, yellow-poplar, and eastern white pine. Droughtiness during the growing season causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The rock outcrops restrict the use of some types of lumbering equipment, and slope further limits the use of equipment.

The depth to bedrock, slope, the high shrink-swell, and the slow permeability are the main limitations of the soil for nonfarm use. Fractures and caverns in the limestone bedrock cause a hazard of ground-water pollution in areas used as sites for septic systems.

The capability subclass is VIs.

6F—Carbo-Rock outcrop complex, 25 to 65 percent slopes. This unit is sloping to very steep and is on side slopes of hills and ridges. The areas range from 15 to 100 acres. They consist of about 45 percent well drained Carbo silty clay loam, 45 percent rock outcrop, and 10 percent other soils. The soils and rock outcrop are in such an intricate pattern that it was not practical to map them separately.

Typically, the Carbo soil has a surface layer of brown silty clay loam 5 inches thick. The subsoil is strong brown clay 20 inches thick. Hard limestone bedrock is at a depth of 25 inches.

Included with this unit in mapping are small areas that are less than 45 percent rock outcrop and areas of Frederick soils.

The permeability of this Carbo soil is slow. The available water capacity is low. Surface runoff is rapid to very rapid. The surface layer is low to moderate in content of organic matter, and natural fertility is high. The soil is slightly acid or neutral. The subsoil has a high shrink-swell potential. The rooting zone and the depth to bedrock range from 20 to 40 inches.

Most areas of this soil are in woodland. A few areas are in permanent pasture.

Slope and the rock outcrop make this unit generally unsuited to cultivated crops and poorly suited to pasture and hay. The surface layer of the soil compacts easily if the pasture is grazed when the soil is wet. This and overgrazing increase runoff and erosion. The use of proper stocking rates, rotational and deferred grazing, and the use of fertilizer are the main pasture management practices.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for oaks, yellow-poplar, and eastern white pine. Droughtiness during the growing season causes a high rate of seedling mortality. Placing logging roads and skid trails on the

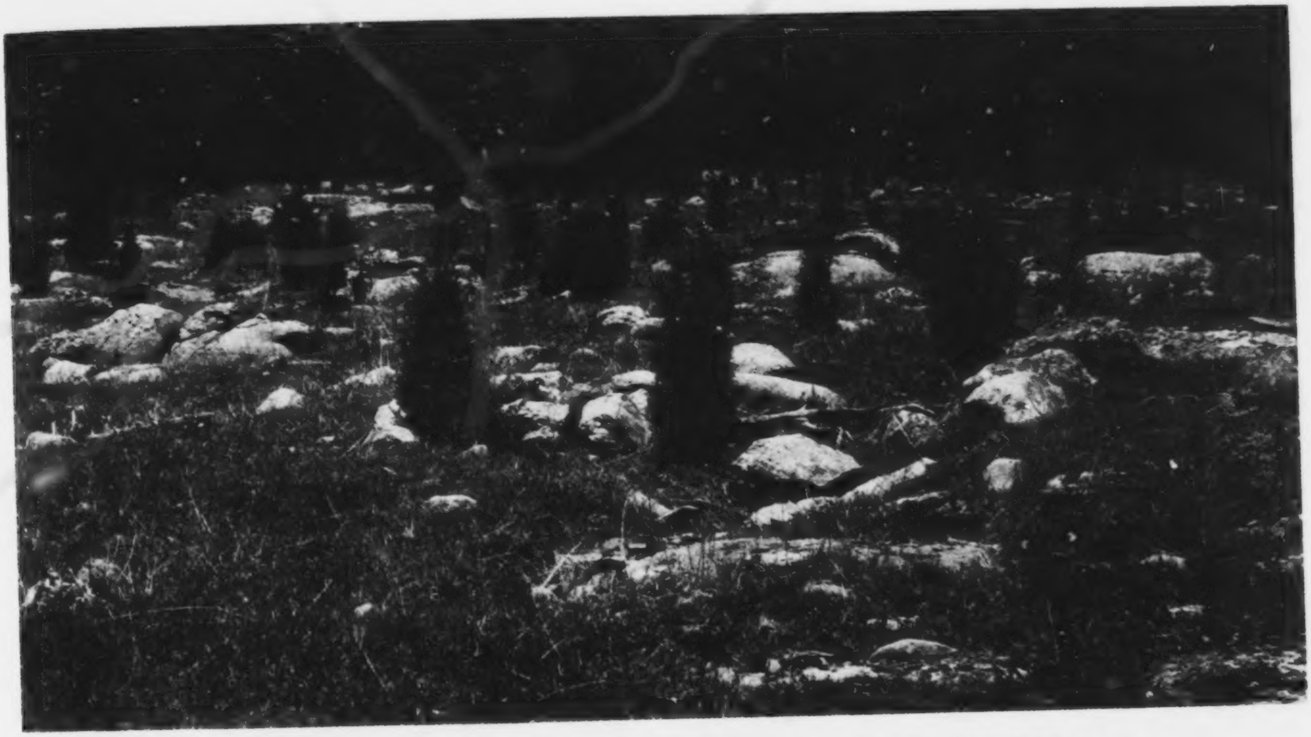

Figure 1.—Native pasture on Carbo silty clay loam, very rocky, 15 to 45 percent slopes.

contour helps to reduce runoff and erosion. The rock outcrops restrict the use of some types of lumbering equipment, and slope further limits the use of equipment.

The depth to bedrock, slope, the high shrink-swell, and the slow permeability are the main limitations of the soil for nonfarm use. Fractures and caverns in the limestone bedrock cause a hazard of ground-water pollution in areas used as sites for septic systems.

The capability subclass is VIIs.

7—Chagrin silt loam. This soil is very deep, nearly level, and well drained. It is on flood plains along streams throughout the county. The areas of this soil commonly are long and narrow and range from 3 to 15 acres. They are subject to frequent, brief flooding during late winter and early spring. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam 9 inches thick. The subsoil is dark yellowish brown and is 33 inches thick. It is silt loam in the upper 29 inches and loam in the lower 4 inches. The substratum is dark yellowish brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, about 1 acre each, of moderately well drained soils and other soils with a surface layer of fine sandy loam. Included areas make up about 5 to 10 percent of the unit.

The permeability of this Chagrin soil is moderate. Surface runoff is slow. The available water capacity is high. The shrink-swell potential of this soil is low. The surface layer is moderate in content of organic matter, and the soil is high in natural fertility and is moderately acid through neutral. The rooting zone and depth to bedrock are more than 60 inches.

Most of the acreage of this soil is cultivated, and the soil is classified as prime farmland in this county.

This soil is well suited to cultivated crops commonly grown in the county. Flooding causes a loss of crops, and replanting is needed in some years. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that increase organic matter content and maintain the tilth of the soil. Using crop residue helps to prevent erosion during flood periods.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is very high. The soil is managed primarily for eastern white pine, yellow-poplar, and black walnut. Seeds and seedlings survive and grow well if competing vegetation is controlled. Logging operations sometimes are delayed by flooding in the early spring.

The flooding is the main limitation of the soil for nonfarm use.

The capability subclass is IIw.

8—Chagrin Variant loamy sand. This soil is very deep, level, and excessively drained. It is on flood plains along streams throughout the survey area. The areas of this soil are irregularly shaped and range from 3 to 7 acres. They are subject to rare flooding. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark grayish brown loamy sand about 14 inches thick. The subsoil is 46 inches thick. It mainly is dark brown, brown, and yellowish brown loamy sand. The substratum is at a depth of more than 60 inches and is yellowish brown loamy sand.

Included with this soil in mapping are a few small areas with a light-colored surface layer or a surface layer of sandy loam. Included areas make up about 5 to 10 percent of the unit.

The permeability of this Chagrin Variant soil is moderately rapid to rapid. Surface runoff is slow. Available water capacity is low. The surface layer is low in content of organic matter. The soil is medium in natural fertility and is slightly acid through neutral. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

Most of the acreage of this soil is used for crops or pasture.

This soil is suited to cultivated crops commonly grown in the county. It is somewhat droughty during the growing season, however, and thus is better suited to plants that have a deep, well developed root system. Incorporating organic matter into the soil and plowing when the soil is at the proper moisture content help to maintain tilth. The use of cover crops and grasses and legumes helps to keep erosion at a minimum.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for oak, yellow-poplar, and eastern white pine. Droughtiness during the growing season causes a high rate of seedling mortality. Logging operations sometimes are delayed by flooding during the spring.

The flooding is the main limitation of the soil for nonfarm use.

The capability subclass is IIs.

9—Chavies Variant sandy loam. This soil is very deep, well drained, and nearly level. It is commonly on low terraces along major and minor streams throughout the survey area. The areas are long and narrow and range from 10 to 35 acres. They are subject to rare flooding. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown sandy loam about 11 inches thick. The subsoil is brown and extends to a depth of 60 inches or more. The upper part is loamy fine sand, and the lower part is sandy loam.

Included with this soil in mapping are a few small areas where the surface layer is silt loam. Included soils make up 5 to 10 percent of the unit.

The permeability of this Chavies Variant soil is moderately rapid, and the available water capacity is moderate. Surface runoff is slow. The surface layer is low in content of organic matter. The soil is high in natural fertility and is neutral or mildly alkaline. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

Most of the acreage of this soil is cultivated, and the soil is classified as prime farmland in this county.

The soil is well suited to cultivated crops commonly grown in the county. Tilth is good and can be maintained and improved by incorporating organic matter into the soil and plowing when the soil is at the proper moisture content. Using cover crops and grasses and legumes helps to control erosion in cultivated areas.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for red oak, yellow-poplar, and black walnut. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Flooding is the main limitation of the soil for nonfarm use.

The capability class is I.

10B—Cotaco loam, 2 to 7 percent slopes. This soil is very deep, moderately well drained, and gently sloping. It is on high terraces along major streams in irregularly shaped areas that range from 3 to 10 acres.

Typically, the surface layer is dark grayish brown loam about 1 inch thick. The subsurface layer is brown loam 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is light yellowish brown loam. The lower part is brownish yellow, strong brown, and light yellowish brown clay loam. Brown, yellow, and gray mottles are throughout the soil.

Included with this soil in mapping are a few small areas of soils that have a surface layer of gravelly loam or fine sandy loam or have a clayey subsoil. Seep spots are in some areas. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Cotaco soil is moderate, and the available water capacity is moderate. Surface runoff is medium to slow. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas ranges from extremely acid through strongly acid. The depth to bedrock is more than 60 inches. Rooting is restricted by a seasonal high water table at a depth of 18 to 30 inches. The subsoil has a high shrink-swell potential.

Most areas of this soil are cultivated, and the soil is classified as prime farmland in this county.

This soil is well suited to cultivated crops commonly grown in the area, but the erosion hazard is moderate in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture also are practices that help to maintain tilth.

This soil is well suited to most of the pasture grasses and hay crops commonly grown in the county, but the soil is poorly suited to alfalfa because of the seasonal high water table. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices.

The potential productivity for trees on this soil is high. The soil is managed primarily for Virginia pine, eastern white pine, and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled.

The seasonal high water table, seepage, and the permeability are the main limitations of the soil for nonfarm use. Stockpiling topsoil at construction sites facilitates eventual reseeding and thus prevents erosion.

The capability subclass is IIe.

10C—Cotaco loam, 7 to 15 percent slopes. This soil is very deep, moderately well drained, and strongly sloping. It is on high terraces along major streams in irregularly shaped areas that range from 5 to 15 acres.

Typically, the surface layer is dark grayish brown loam about 1 inch thick. The subsurface layer is brown loam 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is light yellowish brown loam. The lower part is brownish yellow, strong brown, and light yellowish brown clay loam. Brown, yellow, and gray mottles are throughout the soil.

Included with this soil in mapping are areas of soils with slopes of more than 15 percent. Also included are areas of soils with a surface layer of gravelly loam or a clayey subsoil. Seep areas are in some areas on the lower part of the slope. Included areas make up about 5 to 10 percent of this unit.

The permeability of this Cotaco soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas ranges from extremely acid through strongly acid. The depth to bedrock is more than 60 inches. Rooting is restricted by a seasonal high water table at a depth of 18 to 30 inches. The subsoil has a high shrink-swell potential.

Most areas of this soil are in cultivated crops. A few areas are in permanent pasture and hay.

This soil is moderately well suited to cultivated crops commonly grown in the county, but the hazard of erosion is severe. The tilth of the soil is good, and it can be maintained and improved by incorporating organic matter into the soil and plowing when the soil is at the proper moisture content. Conservation tillage, use of crop residue, use of cover crops and grasses and legumes in the cropping system, and contour stripcropping are practices that help to reduce runoff and control erosion. Tile drainage helps to improve the suitability of seep spots and other wet areas.

This soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for Virginia pine, eastern white pine, and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Seasonal wetness, permeability, and slope are the main limitations of the soil for nonfarm use. Stockpiling topsoil at construction sites facilitates reseeding and thus helps to control erosion.

The capability subclass is IIIe.

11D—Faywood silt loam, 10 to 30 percent slopes. This soil is moderately deep, strongly sloping to steep, and well drained. It commonly is on smooth ridgetops. The areas of this soil mainly are long and narrow. They range from 5 to 25 acres.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil is 25 inches thick. The upper 12 inches of the subsoil is dark yellowish brown silty clay loam, and the lower 13 inches is strong brown shaly silty clay. The substratum is extremely shaly silty clay 8 inches thick. Shale and limestone are at a depth of 36 inches.

Included with this soil in mapping are small areas of soils in which bedrock is at a depth of less than 20 inches or more than 40 inches and small areas of soils that have a surface layer of very stony sandy loam.

Included areas make up about 5 to 10 percent of this unit.

The permeability of this Faywood soil is moderately slow to slow, and the available water capacity is low. Surface runoff is rapid to very rapid. The surface layer is low to moderate in content of organic matter, and natural fertility is high. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock range from 20 to 40 inches. The soil is moderately acid through neutral.

Most areas of this soil are in permanent pasture or woodland.

Slope and a moderate to severe erosion hazard make this soil poorly suited to cultivated crops. The soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotational and deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer, increasing runoff and erosion.

The potential productivity for trees on this soil is moderately high. This soil is managed primarily for eastern white pine and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and control erosion.

Slope, the depth to bedrock, the shrink-swell potential, low strength, and the permeability are the main limitations of the soil for nonfarm use.

The capability subclass is IVe.

11F—Faywood silt loam, 30 to 65 percent slopes. This soil is moderately deep, steep to very steep, and well drained. It is on commonly smooth side slopes of ridges. The areas of this soil commonly are irregularly shaped. They range from 10 to 50 acres.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil is 25 inches thick. The upper 12 inches of the subsoil is dark yellowish brown silty clay loam, and the lower 13 inches is strong brown shaly silty clay. The substratum is extremely shaly silty clay 8 inches thick. Shale and limestone are at a depth of 36 inches.

Included with this soil in mapping are small areas of soils in which bedrock is at a depth of less than 20 inches or more than 40 inches and small areas of soils that have a surface layer of very stony sandy loam. Included areas make up about 5 to 10 percent of this unit.

The permeability of this Faywood soil is moderately slow to slow, and the available water capacity is low. Surface runoff is very rapid. The surface layer is low to moderate in content of organic matter, and natural fertility is high. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock range from 20 to 40 inches. The soil is moderately acid through neutral.

Most areas of this soil are in permanent pasture or woodland.

Slope and a very severe erosion hazard make this soil generally unsuitable for cultivated crops. The soil is suited to pasture crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotational and deferred grazing, and the use of lime and fertilizer help increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion. Slope limits the use of equipment, and the steeper slopes are mostly used for native pasture.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and control erosion. The slope limits safe operation of heavy timber equipment.

Slope, the depth to bedrock, the shrink-swell potential, low strength, and the permeability limit this soil for most types of nonfarm use.

The capability subclass is VIIe.

12—Fluvaquents, nearly level. This unit consists of very deep, nearly level, poorly drained soils on long, narrow flood plains. The areas are mostly along the New River, but a few areas are along small streams. The areas range from 5 to 25 acres. Slopes range from 0 to 3 percent.

The soil material is unconsolidated, stratified alluvium that varies in texture. Many of the areas are strewn with debris such as lumber, trees, tires, tin cans, and other miscellaneous items deposited during recent flooding.

Included with these soils in mapping are small areas that have water on the surface and areas of well drained soils. The areas with water on the surface are in depressions and old channels, and the well drained soils are on slightly higher areas. Included areas make up as much as 20 percent of the unit.

The depth to bedrock in this unit is more than 60 inches. A seasonal high water table is at or near the surface. The soil is very strongly acid to mildly alkaline. Most of the other properties and characteristics of the soils are variable.

Most areas of this unit are covered by water-tolerant trees and shrubs. Flooding and the seasonal high water table make these soils generally unsuitable for most uses other than as wetland wildlife habitat.

The capability subclass is VIIw.

13B—Frederick silt loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the tops of low hills in the limestone valley. Slopes commonly are short, and the areas range from 3 to 10 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas of soils that have a surface layer of cherty silt loam or a surface layer of sandy loam about 15 inches thick. Also included are small areas of soils that have a thinner subsoil than this Frederick soil has. Included areas make up 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil are in crops or pasture, and the soil is classified as prime farmland in this county.

This soil is well suited to cultivated crops commonly grown in the area, but the erosion hazard is moderate in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for yellow-poplar, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet and will not support heavy timber equipment.

The clayey texture of the subsoil, the shrink-swell potential, and low strength are limitations of this soil for nonfarm use. Stockpiling topsoil at construction sites facilitates eventual reseeding and thus helps to control erosion.

The capability subclass is IIe.

13C—Frederick silt loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the tops of low hills in the limestone valley. Slopes commonly are long, and the areas range from 5 to 15 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas of Timberville Variant soils in depressions and drainageways and a few small areas of rock outcrop. Also included are a few small areas of soils on the tops of low hills and ridges that have a surface layer of cherty silt loam or a surface layer of gravelly sandy loam about 15 inches thick. Included areas make up about 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most of the acreage of this soil is used for cultivated crops or pasture and hay. The remaining acreage is in woodland.

This soil is suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture also are practices that help to maintain tilth.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for yellow-poplar, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet and will not support heavy timber equipment.

Slope and the clayey texture of the subsoil are limitations of this soil for nonfarm use. Stockpiling topsoil at construction sites facilitates reseeding and thus helps to control erosion.

The capability subclass is IIIe.

13D—Frederick silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the side slopes of hills and ridges. Slopes are commonly long and winding, and the areas range from 10 to 20 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas of Timberville Variant soils in depressions and drainageways and a few small areas of rock outcrop. Also included are a few small areas of soils on small knolls or nose slopes of ridges that have a surface layer of cherty silt loam or a surface layer of gravelly sandy loam about 15 inches thick. Included areas make up 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil are in permanent pasture. A few areas are cultivated or in hay crops. The remaining acreage is in woodland.

Slope makes this soil poorly suited to cultivated crops commonly grown in the county. The hazard of erosion is severe. Incorporating organic matter into the soil and plowing when the soil is at proper moisture content are practices that maintain and improve tilth. Conservation tillage, use of crop residue, use of cover crops and grasses and legumes in the cropping system, and contour stripcropping are practices that help to reduce runoff and control erosion in cultivated areas.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedling survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope is the main limitation of this soil for most nonfarm uses.

The capability subclass is IVe.

13E—Frederick silt loam, 25 to 35 percent slopes. This soil is very deep, steep, and well drained. It is on the side slopes of ridges. Slopes are commonly long and winding, and the areas range from 10 to 35 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas of rock outcrop. Also included are a few small areas of soils that have a surface layer of cherty silt loam or have a surface layer of stony sandy loam about 15 inches thick. Some small areas are severely eroded. Included areas make up about 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil are in permanent pasture or in woodland.

Slope makes this soil poorly suited to cultivated crops commonly grown in the county. The hazard of erosion is severe in areas that are cultivated and in areas with no plant cover.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedling survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope is the main limitation of this soil for most nonfarm uses.

The capability subclass is VIe.

14B—Frederick cherty silt loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the tops of low hills (fig. 2). Slopes commonly are short, and the areas range from 5 to 25 acres.

Typically, the surface layer is yellowish brown cherty silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas of soils that have a surface layer of silt loam. Also included are a few small areas of soils that have bed-

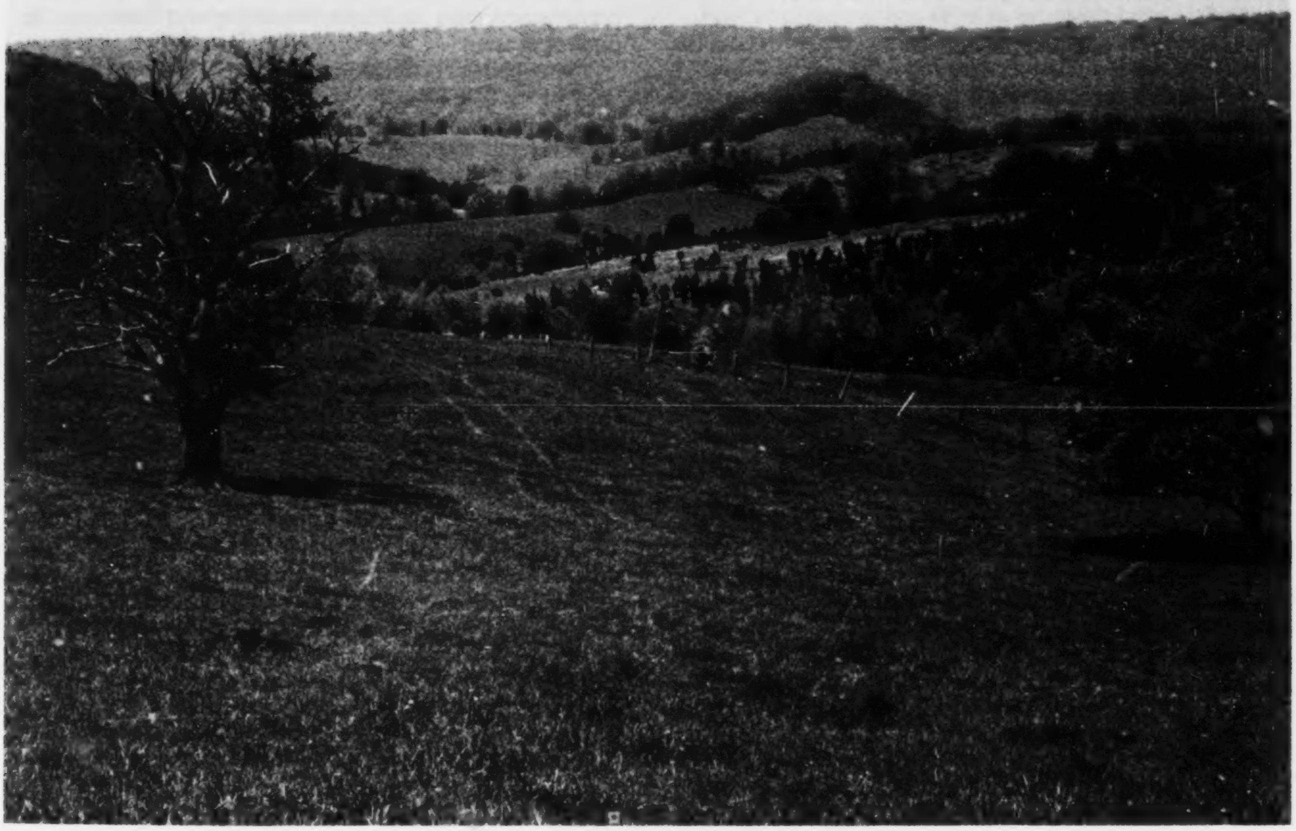

Figure 2.—An area (foreground) of Frederick cherty silt loam, 2 to 7 percent slopes.

rock between depths of 4 and 5 feet. Included areas make up about 5 to 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil are in cultivated crops, and the soil is classified as prime farmland in this county.

This soil is well suited to cultivated crops commonly grown in the area, but the erosion hazard is moderate in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for yellow-poplar, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet and will not support heavy timber equipment.

The clayey texture of the subsoil, the shrink-swell potential, and low strength are limitations of this soil for nonfarm use. Stockpiling topsoil at construction sites facilitates eventual reseeding and thus helps to control erosion.

The capability subclass is IIe.

14C—Frederick cherty silt loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the side slopes of low hills and the tops of ridges. Slopes commonly are long, and the areas range from 5 to 100 acres.

Typically, the surface layer is yellowish brown cherty silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas of soils that have a surface layer of silt loam and areas of soils that have bedrock between depths of 4 and 5 feet. Also included are a few small areas of rock outcrop and a few small areas of severely eroded soils. Included areas make up about 5 to 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil are in pasture and hay. A few areas are in cultivated crops. The remaining areas are in woodland.

This soil is suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for yellow-poplar, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet and will not support heavy timber equipment.

Slope and the clayey texture of the subsoil are limitations of this soil for nonfarm use. Stockpiling topsoil at construction sites facilitates reseeding and thus helps to control erosion.

The capability subclass is IIIe.

14D—Frederick cherty silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the side slopes of ridges. Slopes commonly are long and winding, and the areas range from 10 to 250 acres.

Typically, the surface layer is yellowish brown cherty silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas of soils that have a surface layer of silt loam and a few small areas of rock outcrop. Also included are a few small areas that have a surface layer of sandy loam about 15 inches thick and a few small areas of soil that has bedrock between depths of 4 and 5 feet. Included areas make up 5 to 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil are in permanent pasture or hay. A few areas are in row crops. The remaining acreage is in woodland.

Slope makes this soil poorly suited to cultivated crops commonly grown in the county. The hazard of erosion is severe. Incorporating organic matter into the soil and plowing when the soil is at proper moisture content are practices that maintain and improve tilth. Conservation tillage, use of crop residue, use of cover crops and grasses and legumes in the cropping system, and contour stripcropping are practices that help to reduce runoff and control erosion in cultivated areas.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope is the main limitation of this soil for most nonfarm uses.

The capability subclass is IVe.

14E—Frederick cherty silt loam, 25 to 35 percent slopes. This soil is very deep, steep, and well drained. It is on the side slopes of ridges. Slopes commonly are long and winding, and the areas range from 10 to 500 acres.

Typically, the surface layer is yellowish brown cherty silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas with slopes of more than 35 percent. Also included are a few small areas that have a surface layer of silt loam, a few small areas of outcrop, a few small areas of severely eroded soils, and small areas that have a surface layer of sandy loam about 15 inches thick. Included areas make up 5 to 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil are in permanent pasture or hay. The remaining areas are in woodland.

Slope makes this soil poorly suited to cultivated crops commonly grown in the county. The hazard of erosion is severe in areas that are cultivated and in areas with no plant cover.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope is the main limitation of this soil for most nonfarm uses.

The capability subclass is VIe.

15C—Frederick very stony silt loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the tops of hills and ridges. Slopes commonly are long and winding, and the areas range from 3 to 50 acres. Stones cover 3 to 15 percent of the surface.

Typically, the surface layer is yellowish brown cherty silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam that is 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas with slopes of less than 7 percent and a few small areas where stones cover less than 3 percent of the surface. Included areas make up 5 to 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most acreage of this soil is in woodland. Some areas are used for permanent pasture or hay.

The stones on the surface make this soil poorly suited to cultivated crops, and the hazard of erosion is severe in cultivated areas or areas with no plant cover.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a desirable mixture of grasses and legumes, removing the stones, and the prevention of overgrazing are the main pasture management concerns. The use of proper stocking rates and rotational and deferred grazing are the chief pasture management practices.

The potential productivity for trees on this soil is high. The soil is managed primarily for yellow-poplar, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. The soil is soft when wet and will not support heavy timber equipment.

Slope, the stones on the surface, and the clayey texture of the subsoil are the main limitations of this soil for nonfarm use.

The capability subclass is IVs.

15D—Frederick very stony silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the tops and sides of hills and ridges. Slopes commonly are long and winding, and the areas range from 5 to 250 acres. Stones cover 3 to 15 percent of the surface.

Typically, the surface layer is yellowish brown cherty silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam that is 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas where stones cover less than 3 percent of the surface. Inclusions make up 5 to 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most of the acreage of this soil is in woodland. Some areas are used primarily for permanent pasture.

Slope and the stones on the surface make this soil poorly suited to cultivated crops. The hazard of erosion is very severe in cultivated areas.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a desirable mixture of grasses and legumes, removing the stones, and the prevention of overgrazing are the main pasture management concerns. The use of proper stocking rates and rotational and deferred grazing are the chief pasture management practices.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope, the stones on the surface, and the clayey texture of the subsoil are the main limitations of this soil for nonfarm use.

The capability subclass is VIs.

15E—Frederick very stony silt loam, 25 to 35 percent slopes. This soil is very deep, steep, and well drained. It is on the sides of hills and ridges. Slopes commonly are long and winding, and the areas range from 10 to 250 acres. Stones cover 3 to 15 percent of the surface.

Typically, the surface layer is yellowish brown cherty silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam that is 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 6 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this soil in mapping are a few small areas where stones cover less than 3 percent of the surface and a few small areas with slopes of more than 35 percent. Included areas make up 5 to 10 percent of this unit.

The permeability of this Frederick soil is moderate, and the available water capacity is moderate. Runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility. In unlimed areas it is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Slope and the stones on the surface make this soil generally unsuitable for cultivated crops and poorly suited to pasture and hay. The slope is a hazard to the operation of farm machinery.

The potential productivity for trees on this soil is high, and most areas are wooded. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope, the stones on the surface, and the clayey texture of the subsoil are the main limitations of this soil for nonfarm use.

The capability subclass is VIs.

16D—Frederick-Rock outcrop complex, 10 to 30 percent slopes. This unit consists of very deep, strongly sloping to steep, well drained soils and areas of rock outcrop. The unit is on the tops of low hills and ridges. Slopes commonly are long and winding. The areas range from 10 to 20 acres. They consist of about 70 percent Frederick soils, 20 percent rock outcrop, and 10 percent other soils. The Frederick soils and rock outcrop are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Frederick soils is yellowish brown silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam that is 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 10 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this unit in mapping are a few small areas that are less than 20 percent rock outcrop or where rock outcrop and stones cover as much as 50 percent of the surface. A few small areas have slopes of less than 10 percent, and small quarries are in some units.

The permeability of these Frederick soils is moderate, and the available water capacity is moderate. Runoff is rapid to very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid to strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this unit are in woodland. Some areas are in permanent pasture, and some are in woodland.

Slope and the areas of rock outcrop make this unit poorly suited to cultivated crops. The hazard of erosion is very severe in areas with no plant cover.

This unit is suited to pasture and hay, but slope and the areas of rock outcrop limit the use of farm machinery. Establishing and maintaining a desirable mixture of grasses and legumes and the prevention of overgrazing are the main pasture management concerns. The use of proper stocking rates and rotational and deferred grazing are the chief pasture management practices.

Potential productivity for trees on this unit is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Rock outcrops and slope restrict the use of some types of lumbering equipment.

Slope, the rock outcrops, and the clayey texture of the subsoil are the main limitations of this unit for nonfarm use.

The capability subclass is VIs.

16F—Frederick-Rock outcrop complex, 30 to 60 percent slopes. This unit consists of very deep, steep to very steep, well drained soils and areas of rock outcrop. The unit is on the side slopes of hills and ridges. Slopes commonly are long and winding. The areas range from 10 to 40 acres. They consist of about 70 percent Frederick soils, 20 percent rock outcrop, and 10 percent other soils. The Frederick soils and rock outcrop are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Frederick soils is yellowish brown silt loam about 8 inches thick underlain with a mixture of yellowish brown silt loam and reddish yellow silty clay loam that is 2 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 10 inches is yellowish red silty clay loam, and the lower part is yellowish red clay.

Included with this unit in mapping are a few small areas that are less than 20 percent rock outcrop or where rock outcrop and stones cover as much as 50 percent of the surface. Also included are a few small areas of severely eroded Frederick soils.

The permeability of these Frederick soils is moderate, and the available water capacity is moderate. Runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid to strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a high shrink-swell potential in the lower part.

Most areas of this soil unit are in woodland. A few areas are used for permanent pasture.

Slope and the rock outcrops make this unit generally unsuitable for cultivated crops. This unit is suited to pasture, but slope and the areas of rock outcrop limit the use of farm machinery. Establishing and maintaining a desirable mixture of grasses and legumes and the prevention of overgrazing are the main pasture management concerns. The use of proper stocking rates and rotational and deferred grazing are the chief pasture management practices.

Potential productivity for trees on this unit is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Rock outcrops and slope restrict the use of some types of lumbering equipment.

Slope, the rock outcrops, and the clayey texture of the subsoil are the main limitations of this unit for nonfarm use.

The capability subclass is VIIs.

17C—Gilpin silt loam, 7 to 15 percent slopes. This soil is moderately deep, strongly sloping, and well drained. It is on the tops of hills and ridges and on foot slopes. The areas of this soil are long and narrow and range from 3 to 10 acres.

Typically, the surface layer of this soil is dark brown silt loam about 2 inches. The subsurface layer is yellowish brown silt loam 5 inches thick. The subsoil is reddish yellow shaly silt loam 22 inches thick. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Soft, light olive brown shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are a few small areas of Sequoia soils, a few areas near Rich Creek that have a red subsoil, and a few areas with a surface layer of shaly silt loam. Included soils make up about 10 percent of this unit.

The permeability of this Gilpin soil is moderate, and the available water capacity is low. Surface runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas ranges from extremely acid through strongly acid. The subsoil has a low shrink-swell potential. The rooting zone and depth to bedrock range from 20 to 40 inches.

Most areas of this soil are in permanent pasture or hay. A few areas are in woodland.

This soil is suited to cultivated crops commonly grown in the county, but the erosion hazard is severe in cultivated areas and the soil is droughty in summer. Conservation tillage, the use of cover crops, and contour tillage are practices that help to control erosion.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the depth to bedrock are the main limitations of the soil for nonfarm use.

The capability subclass is IIIe.

17D—Gilpin silt loam, 15 to 30 percent slopes. This soil is moderately deep, moderately steep to steep, and well drained. It is on the tops and side slopes of ridges. The soil is commonly in irregularly shaped areas that range from 10 to 25 acres.

Typically, the surface layer of this soil is dark brown silt loam about 2 inches thick. The subsurface layer is yellowish brown silt loam 5 inches thick. The subsoil is reddish yellow shaly silt loam 22 inches thick. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Soft, light olive brown shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are a few small areas of Sequoia soils, a few areas near Rich Creek that have a red subsoil, a few areas of soils that are more than 40 inches deep to bedrock, and small areas of Gilpin soils with a surface layer of shaly silt loam. Also included are small areas of Berks soils and a few areas of rock outcrop. Included areas make up about 10 percent of this unit.

The permeability of this Gilpin soil is moderate, and the available water capacity is low. Surface runoff is rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas ranges from extremely acid through strongly acid. The subsoil has a low shrink-swell potential. The rooting zone and depth to bedrock range from 20 to 40 inches.

Most areas of this soil are in permanent pasture, hay, or woodland.

This soil is moderately well suited to cultivated crops if intensive conservation practices such as no-till farming are used to control a very severe erosion hazard. The soil is better suited to small grain crops than to row crops. Operation of most types of farm equipment on steep parts of this soil is hazardous. The soil is droughty during summer.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Droughtiness on the south-facing slopes during the growing season causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope and the depth to bedrock are the main limitations of this soil for nonfarm use.

The capability subclass is IVe.

17F—Gilpin silt loam, 30 to 65 percent slopes. This soil is moderately deep, steep to very steep, and well drained. It is on the side slopes of ridges. This soil is commonly in irregularly shaped areas that range from 20 to 50 acres.

Typically, the surface layer of this soil is dark brown silt loam about 2 inches. The subsurface layer is yellowish brown silt loam 5 inches thick. The subsoil is reddish yellow shaly silt loam 22 inches thick. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Soft, light olive brown shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are small areas of Sequoia soils, a few areas near Rich Creek that have a red subsoil, and small areas of Berks soils. Also included are a few small areas of rock outcrop. Included areas make up about 10 percent of this unit.

The permeability of this Gilpin soil is moderate, and the available water capacity is low. Surface runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas ranges from extremely acid through strongly acid. The subsoil has a low shrink-swell potential. The rooting zone and depth to bedrock range from 20 to 40 inches.

Slope makes this soil generally unsuited to cultivated crops. The erosion hazard is very severe in areas with no plant cover. The soil is moderately well suited to native pasture, but the operation of most types of farm machinery is hazardous on this soil, and the soil is very droughty during summer. The use of proper stocking rates and rotational and deferred grazing are the main pasture management practices. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Droughtiness on the south-facing slopes during the growing season causes a high rate of seedling mortality. Placing logging roads on the contour helps to reduce runoff and erosion. The slope of the soil limits safe operation of heavy timber equipment.

Slope and the depth to bedrock limit this soil for nonfarm use.

The capability subclass is VIIe.

18D—Gilpin very stony silt loam, 10 to 30 percent slopes. This soil is moderately deep, strongly sloping to steep, and well drained. It is on the tops and side slopes of ridges. The soil is commonly in irregularly shaped areas that range from 10 to 25 acres. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of this soil is dark brown shaly silt loam about 2 inches thick. The subsurface layer is yellowish brown shaly silt loam 5 inches thick. The subsoil is reddish yellow shaly silt loam 22 inches thick. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Soft, light olive brown shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are small areas of Sequoia soils, a few areas near Rich Creek that have a red subsoil, and small areas of Berks soils. Included soils make up about 10 percent of this unit.

The permeability of this Gilpin soil is moderate, and the available water capacity is low. Surface runoff is rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas ranges from extremely acid through strongly acid. The subsoil has a low shrink-swell potential. The rooting zone and depth to bedrock range from 20 to 40 inches.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is severe in areas with no plant cover. The soil is suited to pasture but is droughty during summer.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. Most areas are wooded. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Droughtiness on the south-facing slopes during the growing season causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope, the stones on the surface, and the depth to bedrock are the main limitations of the soil for nonfarm use.

The capability subclass is VIs.

18F—Gilpin very stony silt loam, 30 to 65 percent slopes. This soil is moderately deep, steep to very steep, and well drained. It is on the side slopes of ridges. This soil is commonly in irregularly shaped areas that range from 15 to 50 acres. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of this soil is dark brown shaly silt loam about 2 inches thick. The subsurface layer is yellowish brown shaly silt loam 5 inches thick. The subsoil is reddish yellow shaly silt loam 22 inches thick. The substratum is reddish yellow extremely shaly silt loam 5 inches thick. Soft, light olive brown shale bedrock is at a depth of 34 inches.

Included with this soil in mapping are small areas of Berks soils, a few areas near Rich Creek that have a red subsoil, and small areas of Nolichucky soils. Included soils make up about 10 percent of this unit.

The permeability of this Gilpin soil is moderate, and the available water capacity is low. Surface runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas ranges from extremely acid through strongly acid. The subsoil has a low shrink-swell potential. The rooting zone and depth to bedrock range from 20 to 40 inches.

Slope and the stones on the surface make this soil generally unsuitable for farming. The erosion hazard is severe in areas with no plant cover. The soil is suited to pasture but is droughty during summer.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. Most areas are wooded. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Droughtiness on the south-facing slopes during the growing season causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope, the stones on the surface, and the depth to bedrock are the main limitations of the soil for nonfarm use.

The capability subclass is VIIs.

19C—Jefferson loam, 0 to 15 percent slopes. This soil is very deep, nearly level to strongly sloping, and well drained. It is on mountain side slopes and foot slopes. Slopes are smooth. The areas commonly are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown loam, the middle part is yellowish red very gravelly sandy loam, and the lower part is yellowish red gravelly sandy clay loam.

Included with this soil in mapping in small drainageways and depressions are areas that have stones on the surface. Included areas make up about 10 percent of this unit.

The permeability of this Jefferson soil is moderately rapid, and the available water capacity is moderate. Runoff is slow to medium. The surface layer is low to high in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

Much of the acreage of this soil is used for farming, and the soil is classified as prime farmland. A few areas are in woodland.

This soil is suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for yellow-poplar, eastern white pine, and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope is a limitation of the soil for most nonfarm uses. Stockpiling topsoil, reseeding, and use of sediment basins are practices that help to control erosion at construction sites.

The capability subclass is IIIe.

20C—Jefferson very stony loam, 0 to 15 percent slopes. This soil is very deep, nearly level to strongly sloping, and well drained. It is on mountainsides and foot slopes. Slopes are smooth. The areas commonly are long and narrow and range from 5 to 50 acres. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown loam, the middle part is yellowish red very gravelly sandy loam, and the lower part is yellowish red gravelly sandy clay loam.

Included with this soil in mapping in small drainageways and depressions are areas where stones cover 15 to 50 percent of the surface. Included areas make up 5 to 10 percent of this unit.

The permeability of this Jefferson soil is moderately rapid, and the available water capacity is moderate. Runoff is slow to medium. The surface layer is low to high in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

The stones on the surface make this soil poorly suited to cultivated crops, and the hazard of erosion is severe if the soil is cleared and cultivated. Cleared areas are suited to field crops and hay and pasture.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderately high. Most areas are wooded. The soil is managed primarily for yellow-poplar, eastern white pine, and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope and the stones on the surface limit this soil for nonfarm use.

The capability subclass is VIs.

20E—Jefferson very stony loam, 15 to 35 percent slopes. This soil is very deep, moderately steep to steep, and well drained. It is on steep mountainsides and foot slopes. Slopes are smooth. The areas commonly are long and narrow and range from 15 to 100 acres. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown loam, the middle part is yellowish red very gravelly sandy loam, and the lower part is yellowish red gravelly sandy clay loam.

Included with this soil in mapping in small drainageways and depressions are areas where stones cover 15 to 50 percent of the surface. Included areas make up 5 to 10 percent of this unit.

The permeability of this Jefferson soil is moderately rapid, and the available water capacity is moderate. Runoff is rapid. The surface layer is low to high in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

Most areas of this soil are in woodland. A few areas are used for pasture.

Slope and the stones on the surface make this soil generally unsuited to farming. The soil is suited to native pasture, but the hazard of erosion is severe in areas with no plant cover.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the stones on the surface limit safe operation of heavy timber equipment and are the main limitations of the soil for nonfarm use.

The capability subclass is VIIs.

21C—Jefferson extremely stony loam, 0 to 15 percent slopes. This soil is very deep, level to strongly sloping, and well drained. It is on mountainsides and foot slopes. Slopes are smooth. The areas commonly are long and narrow and range from 5 to 50 acres. Stones at least 10 inches in diameter cover 15 to 50 percent of the surface.

Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown loam, the middle part is yellowish red very gravelly sandy loam, and the lower part is yellowish red gravelly sandy clay loam.

Included with this soil in mapping are small areas where stones cover less than 15 percent of the surface. Included areas range from 1 to 3 acres and make up 5 to 10 percent of this unit.

The permeability of this Jefferson soil is moderately rapid, and the available water capacity is moderate. Runoff is slow to medium. The surface layer is low to high in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

Most areas of this soil are wooded. A few areas are in permanent pasture.

Slope and the stones on the surface make this soil generally unsuited to farming and are the main limitations for nonfarm use.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. The stones on the surface of the soil limit safe operation of some types of heavy timber equipment.

The capability subclass is VIIs.

21E—Jefferson extremely stony loam, 15 to 35 percent slopes. This soil is very deep, moderately steep to steep, and well drained. It is on mountainsides and foot slopes. Slopes are smooth. The areas are long and narrow and range from 15 to 100 acres. Stones at least 10 inches in diameter cover 15 to 50 percent of the surface.

Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown loam, the middle part is yellowish red very gravelly sandy loam, and the lower part is yellowish red gravelly sandy clay loam.

Included with this soil in mapping are small areas where stones cover less than 15 percent of the surface. Included areas make up 5 to 10 percent of this unit.

The permeability of this Jefferson soil is moderately rapid, and the available water capacity is moderate. Runoff is rapid. The surface layer is low to high in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

Most areas of this soil are in woodland. A few areas are in permanent pasture.

Slope and the stones on the surface make this soil generally unsuited to farming and are the main limitations for nonfarm use.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope and the stones on the surface limit operation of timber equipment.

The capability subclass is VIIs.

21F—Jefferson extremely stony loam, 35 to 65 percent slopes. This soil is very deep, very steep, and well drained. It is on mountainsides and foot slopes. Slopes are smooth. The areas commonly are long and narrow and range from 100 to 500 acres. Stones at least 10 inches in diameter cover 15 to 50 percent of the surface.

Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is strong brown loam, the middle part is yellowish red very gravelly sandy loam, and the lower part is yellowish red gravelly sandy clay loam.

Included with this soil in mapping are small areas where stones cover less than 15 percent of the surface. Included areas make up 5 to 10 percent of this unit.

The permeability of this Jefferson soil is moderately rapid, and the available water capacity is moderate. Runoff is very rapid. The surface layer is low to high in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches. The subsoil has a low shrink-swell potential.

Most areas of this soil are in woodland. A few areas are in permanent pasture.

Slope and the stones on the surface make this soil generally unsuited to farming and are the main limitations for nonfarm use.

The potential productivity for trees on this soil is high on north-facing slopes and moderately high on south-facing slopes. The soil is managed primarily for eastern white pine, yellow-poplar, and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope and the stones on the surface limit operation of timber equipment.

The capability subclass is VIIs.

22D—Jefferson Variant and Drall soils, very stony, 10 to 30 percent slopes. This unit consists of sloping to steep soils on mountain ridges and convex side slopes. The areas of these soils commonly are long and winding. They range from 5 to 250 acres. Some consist mostly of Jefferson Variant soils, some mostly of Drall soils, and some of both. The total acreage of the unit is about 60 percent very deep, well drained Jefferson Variant soils; 30 percent deep, excessively drained Drall soils; and 10 percent other soils. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of the Jefferson Variant soils is very dark gray cobbly sandy loam 2 inches thick. The subsurface layer is yellowish brown cobbly sandy loam 7 inches thick. The subsoil is strong brown and yellowish red cobbly sandy loam 36 inches thick. The substratum is yellowish red, mottled gravelly loamy sand to a depth of 60 inches or more.

Typically, the surface layer of the Drall soils is very dark grayish brown cobbly loamy sand 2 inches thick. The subsoil is yellowish brown and light yellowish brown cobbly loamy sand 22 inches thick. The substratum is brown very cobbly sand 23 inches thick. Partially weathered sandstone bedrock is at a depth of 47 inches.

Included with this unit in mapping are small areas of Lehew and Wallen soils on mountain ridges. Also included are small areas of Nolichucky soils and areas where the soil is as little as 20 inches deep to bedrock.

Permeability is moderately rapid in these Jefferson Variant soils and rapid in these Drall soils. The available water capacity is moderate in the Jefferson Variant soils and very low in the Drall soils. Surface runoff is rapid. Both soils are low in natural fertility. The surface layer of both is low in content of organic matter. The surface layer and subsoil are very strongly acid or strongly acid. The rooting zone and depth to bedrock are more than 60 inches in the Jefferson Variant soils and 40 to 60 inches in the Drall soils. The subsoil of both soils has a low shrink-swell potential.

Most areas of these soils are in woodland. A few cleared areas are used for hay or pasture.

Slope and the stones on the surface make these soils generally unsuited to cultivated crops and poorly suited to pasture and hay. Some areas that have been cleared of stones are suited to permanent pasture, but the erosion hazard is severe in areas without plant cover, and the soils are droughty during the late summer and early fall. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, and rotational and deferred grazing are the main pasture management practices. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential productivity for trees on the Jefferson Variant soils is high on north-facing slopes and moderately high on south-facing slopes. On the Drall soils, it is moderately high on the north-facing slopes and moderate on the south-facing slopes. These soils are managed primarily for eastern white pine, Virginia pine, and yellow-poplar. Droughtiness in the Drall soils causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope, the stones on the surface, and the permeability are the main limitations of the soils for nonfarm uses.

The capability subclass is VIs.

22F—Jefferson Variant and Drall soils, very stony, 30 to 65 percent slopes. This unit consists of steep to very steep soils on convex mountain side slopes. The areas of these soils commonly are long and winding and range from 5 to 300 acres. Some consist mostly of Jefferson Variant soils, some mostly of Drall soils and some of both. The total acreage of the unit is about 60 percent very deep, well drained Jefferson Variant soils; 30 percent deep, excessively drained Drall soils; and 10 percent other soils. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of the Jefferson Variant soils is very dark gray cobbly sandy loam 2 inches thick. The subsurface layer is yellowish brown cobbly sandy loam 7 inches thick. The subsoil is strong brown and yellowish red cobbly sandy loam 36 inches thick. The substratum is yellowish red, mottled gravelly loamy sand to a depth of 60 inches or more.

Typically, the surface layer of the Drall soils is very dark grayish brown cobbly loamy sand 2 inches thick. The subsoil is yellowish brown and light yellowish brown cobbly loamy sand 22 inches thick. The substratum is brown very cobbly sand 23 inches thick. Partially weathered sandstone bedrock is at a depth of 47 inches.

Included with this unit in mapping are small areas of bedrock escarpments and small areas of Lehew and Wallen soils on upper side slopes. Also included are small areas of Nolichucky soils and areas where the soil is as little as 20 inches deep to bedrock.

Permeability is moderately rapid in these Jefferson Variant soils and rapid in these Drall soils. The available water capacity is moderate in the Jefferson Variant soils and very low in the Drall soils. Surface runoff is very rapid. Both soils are low in natural fertility. The surface layer of both is low in content of organic matter. The surface layer and subsoil are very strongly acid or strongly acid. The rooting zone and the depth to bedrock are more than 60 inches in the Jefferson Variant soils and 40 to 60 inches in the Drall soils. The subsoil of both soils has low shrink-swell potential.

Most areas of these soils are in woodland.

Slope and the stones on the surface make these soils generally unsuited to cultivated crops and poorly suited to pasture and hay. Some areas that have been cleared of stones are suited to permanent pasture, but the erosion hazard is severe in areas without plant cover, and the soils are droughty during the late summer and early fall. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, and rotational and deferred grazing are the main pasture management pratices. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential productivity for trees on the Jefferson Variant soils is high on north-facing slopes and moderately high on south-facing slopes. On the Drall soils it is moderately high on the north-facing slopes and moderate on the south-facing slopes. These soils are managed primarily for eastern white pine, Virginia pine, and yellow-poplar. Droughtiness in the Drall soils causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope limits safe operation of heavy timber equipment.

Slope, the stones on the surface, and the permeability are the main limitations of the soils for nonfarm uses.

The capability subclass is VIIs.

23F—Lehew and Wallen soils, very stony, 35 to 65 percent slopes. This unit consists of steep to very steep, moderately deep soils on narrow convex mountaintops and on upper convex side slopes. The areas of this unit are long and narrow and range from 100 to 500 acres. Some areas consist mostly of Lehew soils, some mostly of Wallen soils, and some of both. The total acreage of the unit is about 60 percent well drained Lehew soils; 30 percent somewhat excessively drained Wallen soils and 10 percent other soils. Stones at least 20 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of the Lehew soils is very dark grayish brown gravelly sandy loam 3 inches thick. The subsoil is 26 inches thick. The upper part of the subsoil is yellowish red and reddish brown gravelly loam, and the lower part is reddish brown very gravelly loam. The substratum to a depth of 37 inches is reddish brown very channery sandy loam. Below 37 inches is hard sandstone with thin shale strata.

Typically, the surface layer of the Wallen soils is very dark gray channery sandy loam 2 inches thick. The subsurface layer is yellowish brown channery sandy loam. The subsoil is light yellowish brown and reddish yellow very channery sandy loam 14 inches thick. The substratum is strong brown extremely channery sandy loam 9 inches thick. Fractured sandstone bedrock is at a depth of 31 inches.

Included with these soils in mapping are long narrow areas of rock outcrops and ledges on mountaintops. Also included are areas, ranging from 5 to 10 acres, of Jefferson Variant and Drall soils in drainageways and Gilpin soils on lower side slopes and benches.

These Lehew soils have moderately rapid to rapid permeability, and the Wallen soils have moderately rapid permeability. Runoff is rapid to very rapid. Available water capacity is very low. The surface layer in both soils is low in content of organic matter, and natural fertility is low. Shrink-swell potential is low. The Lehew soils are very strongly acid or strongly acid, and the Wallen soils range from very strongly acid through moderately acid. The rooting zone and depth to bedrock range from 20 to 40 inches but commonly are between 30 and 40 inches.

Most areas of this unit are wooded.

Slope and the stones on the surface make this soil generally unsuited to crops and poorly suited to pasture. The hazard of erosion is very severe if the plant cover is removed. The stones on the surface make the use of farm machinery impractical in most areas.

The potential productivity for trees on the Lehew soils is moderately high on north-facing slopes and moderate on south-facing slopes. On the Wallen soil, it is moderate on north-facing slopes and low on south-facing slopes. These soils are managed primarily for eastern white pine, Virginia pine, and shortleaf pine. Droughtiness on the south-facing slopes causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope limits safe operation of heavy timber equipment.

Slope, the depth to bedrock, and the stones on the surface are the major limitations of the unit for community development. The permeability of the soils causes a hazard of ground-water pollution in areas used as sites for septic systems.

The capability subclass is VIIs.

24C—Lily gravelly sandy loam, 0 to 15 percent slopes. This soil is moderately deep, nearly level to strongly sloping, and well drained. It is on ridgetops. Slopes are smooth, and the areas commonly are long and narrow and range from 5 to 100 acres.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam, the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Included with this soil in mapping in small drainageways and depressions are areas that have stones on the surface. Also included are areas where the depth to bedrock is more than 40 inches and small areas of soils that have a thin, clayey layer immediately above the bedrock. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Lily soil is moderately rapid, and the available water capacity is low. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

Most areas of this soil are in woodland. A few areas are in permanent pasture.

This soil is suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderate. The soil is managed primarily for eastern white pine, Virginia pine, and short leaf pine. Seeds and seedlings survive and grow well.

Slope and a lack of accessibility are the main limitations of this soil for nonfarm use. Stockpiling topsoil at construction sites facilitates reseeding and thus helps to control erosion.

The capability subclass is IIIe.

24D—Lily gravelly sandy loam, 15 to 35 percent slopes. This soil is moderately deep, moderately steep to steep, and well drained. It is on mountain side slopes. Slopes are smooth. The areas commonly are long and wide and range from 5 to 100 acres.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam, the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Included with this soil in mapping drainageways are areas that have stones on the surface. Also included are areas where the depth to bedrock is more than 40 inches. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Lily soil is moderately rapid, and the available water capacity is low. Runoff is rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

Most areas of this soil are in woodland. A few areas are in permanent pasture.

The areas of this soil that have slopes of less than 25 percent are suited to cultivated crops commonly grown in the county. Many other areas are nearly inaccessible and are better suited to pasture or trees. The hazard of erosion is severe in areas that are cultivated or that have no plant cover. Tilth can be maintained or improved by incorporating organic matter into the soil and by plowing when the soil is at the proper moisture content. Conservation tillage, the use of crop residue, the use of cover crops and grasses and legumes in the cropping system, contour tillage, and contour stripcropping help to reduce runoff and control erosion.

This soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderate on north-facing slopes and low on south-facing slopes. The soil is managed primarily for Virginia pine, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well on the north-facing slopes, but droughtiness on the south-facing slopes causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion.

Slope and a lack of accessibility are the main limitations of this soil for nonfarm use. Stockpiling topsoil at construction sites facilitates reseeding and thus helps to control erosion.

The capability subclass is VIe.

25F—Lily extremely stony sandy loam, 35 to 65 percent slopes. This soil is moderately deep, very steep, and well drained. It is on mountain side slopes. Slopes are smooth. The areas of this soil commonly are long and narrow and range from 25 to 250 acres. Stones at least 10 inches in diameter cover 15 to 50 percent of the surface.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam. the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Included with this soil in mapping are areas where stones cover less than 15 percent of the surface. Also included are areas where the depth to bedrock is more than 40 inches. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Lily soil is moderately rapid, and the available water capacity is low. Runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

Slope and the stones on the surface make the soil generally unsuitable for farming and are the main limitations for nonfarm use.

The potential productivity for trees on this soil is moderate on north-facing slopes and low on south-facing slopes. Most areas are wooded. The soil is managed primarily for Virginia pine, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well on the north-facing slopes, but droughtiness on the south-facing slopes causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the stones on the surface limit safe operation of heavy timber equipment.

The capability subclass is VIIs.

26F—Lily gravelly sandy loam, very rocky, 35 to 65 percent slopes. This soil is moderately deep, very steep, and well drained. It is on mountain side slopes. Slopes are smooth. The areas of this soil commonly are long and narrow and range from 15 to 150 acres. Rock outcrop covers about 10 percent of the surface area.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam, the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Included with this soil in mapping are areas with stones on the surface and areas where up to 50 percent of the surface is rock outcrop. Also included are areas where the depth to bedrock is more than 40 inches. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Lily soil is moderately rapid, and the available water capacity is low. Runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and in unlimed areas is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

Slope and the areas of rock outcrop make this soil generally unsuited to farming and are the major limitations for nonfarm use.

The potential productivity for trees on this soil is moderate on north-facing slopes and low on south-facing slopes. Most areas are wooded. The soil is managed primarily for Virginia pine, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well on the north-facing slopes, but droughtiness on the south-facing slopes causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the rock outcrop limit safe operation of heavy timber equipment.

The capability subclass is VIIs.

27C—Lily-Bailegap complex, very stony, 2 to 15 percent slopes. This unit consists of gently sloping to strongly sloping, well drained soils on mountain ridgetops generally at an elevation of more than 3,000 feet. The areas of this unit commonly are long and narrow and range from 5 to 100 acres. They are about 55 percent moderately deep Lily soils, 35 percent deep Bailegap soils, and 10 percent other soils. The soils are so intermingled that it was not practical to map them separately. Slopes are smooth. Large stones cover 3 to 15 percent of the surface.

Typically, the surface layer of the Lily soils is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam, the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Typically, the surface layer of the Bailegap soils is dark brown flaggy loam 2 inches thick. The subsurface layer is reddish brown channery silt loam 6 inches thick. The subsoil is reddish brown and is 34 inches thick. The upper part of the subsoil is gravelly silt loam, the middle part is cobbly silt loam and very cobbly silt loam, and the lower part is extremely cobbly silt loam. The substratum is fractured soft sandstone bedrock 16 inches thick. Red sandstone bedrock is at a depth of 58 inches.

Included with this unit in mapping are areas where stones cover 15 to 50 percent of the surface. Also included are soils similar to these Lily soils but in which the depth to bedrock is more than 40 inches.

The permeability of these Lily soils is moderately rapid, and the available water capacity is low. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

The permeability of these Bailegap soils is moderate, and the available water capacity is low. Runoff is medium. The surface layer is low in content of organic matter. The soil is low in natural fertility and is very strongly acid. The rooting zone and depth to bedrock range from 40 to 60 inches. The subsoil has a low shrink-swell potential.

Slope and the stones on the surface make this unit generally unsuited to cultivated crops or hay. The unit is suited to pasture, but the stones limit the use of equipment, and many areas are nearly inaccessible. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, and rotational and deferred grazing are the main pasture management practices. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

Potential productivity for trees on this unit is moderate on the Lily soils and moderately high on the Bailegap soils. Most areas are wooded. Seeds and seedlings survive and grow well if competing vegetation is controlled.

The stones on the surface and the depth to bedrock are the main limitations of the unit for nonfarm use.

The capability subclass is VIs.

27E—Lily-Bailegap complex, very stony, 15 to 35 percent slopes. This unit consists of moderately steep to steep, well drained soils on mountain side slopes. The areas of this unit range from 25 to 250 acres. They are about 70 percent moderately deep Lily soils, 20 percent deep Bailegap soils, and 10 percent other soils. The soils are so intermingled that it was not practical to map them separately. Slopes are smooth. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of the Lily soils is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam, the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Typically, the surface layer of the Bailegap soils is dark brown flaggy loam 2 inches thick. The subsurface layer is reddish brown channery silt loam 6 inches thick. The subsoil is reddish brown and is 34 inches thick. The upper part of the subsoil is gravelly silt loam, the middle part is cobbly silt loam and very cobbly silt loam, and the lower part is extremely cobbly silt loam. The substratum is fractured soft sandstone bedrock 16 inches thick. Red sandstone bedrock is at a depth of 58 inches.

Included with this complex in mapping are areas where stones cover 15 to 50 percent of the surface and areas where rock outcrop covers up to 50 percent of the surface. Also included are soils similar to these Lily soils but in which the depth to bedrock is more than 40 inches.

The permeability of these Lily soils is moderately rapid, and the available water capacity is low. Runoff is rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

The permeability of these Bailegap soils is moderate, and the available water capacity is low. Runoff is rapid. The surface layer is low in content of organic matter. The soil is low in natural fertility and is very strongly acid. The rooting zone and depth to bedrock range from 40 to 60 inches. The subsoil has a low shrink-swell potential.

Slope and the stones on the surface make this unit generally unsuited to cultivated crops and hay. Some cleared areas are suitable for pasture, but most are not accessible.

The potential productivity for trees on the Lily soils is moderate on north-facing slopes and low on south-facing slopes. On the Bailegap soils it is moderately high on north-facing slopes and moderate on south-facing slopes. Most areas are wooded. The soils are managed primarily for Virignia pine, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well on the north-facing slopes, but droughtiness on the south-facing slopes causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the stones on the surface limit safe operation of heavy timber equipment.

Slope, the stones on the surface, and the depth to bedrock are the main limitations of the soil for nonfarm use.

The capability subclass is VIs.

27F—Lily-Bailegap complex, very stony, 35 to 65 percent slopes. This unit consists of very steep, well drained soils on mountain side slopes. The areas of this unit range from 25 to 250 acres. They are about 65 percent moderately deep Lily soils, 25 percent deep Bailegap soils, and 10 percent other soils. The soils are so intermingled that it was not practical to map them separately. Slopes are smooth. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of the Lily soils is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam, the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Typically, the surface layer of the Bailegap soils is dark brown flaggy loam 2 inches thick. The subsurface layer is reddish brown channery silt loam 6 inches thick. The subsoil is reddish brown and is 34 inches thick. The upper part of the subsoil is gravelly silt loam, the middle part is cobbly silt loam and very cobbly silt loam, and the lower part is extremely cobbly silt loam. The substratum is fractured soft sandstone bedrock 16 inches thick. Red sandstone bedrock is at a depth of 58 inches.

Included with this unit in mapping are areas where stones cover 15 to 50 percent of the surface. Also included are soils similar to these Lily soils but in which the depth to bedrock is more than 40 inches.

The permeability of these Lily soils is moderately rapid, and the available water capacity is low. Runoff is very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

The permeability of these Bailegap soils is moderate, and the available water capacity is low. Runoff is very rapid. The surface layer is low in content of organic matter. The soil is low in natural fertility and is very strongly acid. The rooting zone and depth to bedrock range from 40 to 60 inches. The subsoil has a low shrink-swell potential.

Slope and the stones on the surface make this unit generally unsuited to farming.

The potential productivity for trees on the Lily soils is moderate on north-facing slopes and low on south-facing slopes. On the Bailegap soils it is moderately high on north-facing slopes and moderate on south-facing slopes. Most areas are wooded. The soils are managed primarily for Virginia pine, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well on the north-facing slopes, but droughtiness on the south-facing slopes causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the stones on the surface limit safe operation of heavy timber equipment.

Slope, the stones on the surface, and the depth to bedrock are the main limitations of the soil for nonfarm use.

The capability subclass is VIIs.

28E—Lily-Bailegap complex, extremely stony, 15 to 35 percent slopes. This unit consists of moderately steep to steep, well drained soils on mountain side slopes. The areas of this unit commonly are long and narrow and range from 5 to 100 acres. They are about 55 percent moderately deep Lily soils, 35 percent deep Bailegap soils, and 10 percent other soils. These soils are so intermingled that it was not practical to map them separately. Slopes are smooth. Large stones cover 15 to 50 percent of the surface.

Typically, the surface layer of the Lily soils is very dark grayish brown gravelly sandy loam about 1 inch thick. The subsurface layer is 9 inches thick. The upper 6 inches of the subsurface layer is dark brown gravelly sandy loam, and the lower 3 inches is a mixture of dark brown gravelly loam and strong brown clay loam. The subsoil is strong brown and is 26 inches thick. The upper part is sandy clay loam, the middle part is gravelly loam, and the lower part is clay loam. Fractured sandstone bedrock is at a depth of 36 inches.

Typically, the surface layer of the Bailegap soils is dark brown flaggy loam 2 inches thick. The subsurface layer is reddish brown channery silt loam 6 inches thick. The subsoil is reddish brown and is 34 inches thick. The upper part of the subsoil is gravelly silt loam, the middle part is cobbly silt loam and very cobbly silt loam, and the lower part is extremely cobbly silt loam. The substratum is fractured soft sandstone bedrock 16 inches thick. Red sandstone bedrock is at a depth of 58 inches.

Included with this unit in mapping are areas where stones cover less than 15 percent of the surface. Also included are soils similar to these Lily soils but in which the depth to bedrock is more than 40 inches.

The permeability of these Lily soils is moderately rapid, and the available water capacity is low. Runoff is medium. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 40 inches. The subsoil has a low shrink-swell potential.

The permeability of these Bailegap soils is moderate, and the available water capacity is low. Runoff is medium. The surface layer is low in content of organic matter. The soil is low in natural fertility and is very strongly acid. The rooting zone and depth to bedrock range from 40 to 60 inches. The subsoil has a low shrink-swell potential.

Slope and the stones on the surface make this unit generally unsuited to farming.

The potential productivity for trees on the Lily soils is moderate on north-facing slopes and low on south-facing slopes. On the Bailegap soils it is moderately high on north-facing slopes and moderate on south-facing slopes. Most areas are wooded. The soils are managed primarily for Virginia pine, eastern white pine, and shortleaf pine. Seeds and seedlings survive and grow well on the north-facing slopes, but droughtiness on the south-facing slopes causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the stones on the surface limit safe operation of heavy timber equipment.

Slope, the stones on the surface, and the depth to bedrock are the main limitations of the soil for nonfarm use.

The capability subclass is VIIs.

29B—Nolichucky loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the tops of hills and on low ridges with smooth slopes. The areas of this soil commonly are irregularly shaped and range from 5 to 10 acres.

Typically, the surface layer of this soil is brown loam about 2 inches thick. The subsurface layer is yellowish brown loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown sandy clay loam, the middle parts are strong brown clay loam and red gravelly clay loam, and the lower part is red and yellowish red clay loam.

Included with this soil in mapping are areas of soils that have stones on the surface or a surface layer of gravelly loam. Also included are a few small areas of soils with a restrictive layer. Included areas make up about 10 percent of this unit.

The permeability of this Nolichucky soil is moderate, and the available water capacity is moderate. Surface runoff is slow to medium. The surface layer of the soil is low in content of organic matter, and the soil is low in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid.

Most areas of this soil are in permanent pasture, hay, or cultivated crops, and the soil is classified as prime farmland in this county. A small acreage is in woodland.

This soil is well suited to cultivated crops commonly grown in the area, but the erosion hazard is moderate in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture content also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled.

This soil is generally suitable for most types of nonfarm use.

The capability subclass is IIe.

29C—Nolichucky loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the tops of hills and ridges. Slopes are smooth. The areas of this soil commonly are irregularly shaped and range from 5 to 20 acres.

Typically, the surface layer of this soil is brown loam about 2 inches thick. The subsurface layer is yellowish brown loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown sandy clay loam, the middle parts are strong brown clay loam and red gravelly clay loam, and the lower part is red and yellowish red clay loam.

Included with this soil in mapping are areas of soils that have stones on the surface or a surface layer of gravelly loam. Also included are a few small areas of soils with a restrictive layer. Included areas make up about 10 percent of this unit.

The permeability of this Nolichucky soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The surface layer of the soil is low in content of organic matter, and the soil is low in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid.

Most areas of this soil are in permanent pasture, hay, or cultivated crops. A small acreage is in woodland.

This soil is suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture content also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled.

Slope is the main limitation of the soil for nonfarm uses.

The capability subclass is IIIe.

29D—Nolichucky loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the side slopes of hills and ridges. Slopes are smooth. The areas of this soil are long and winding and range from 10 to 50 acres.

Typically, the surface layer of this soil is brown loam about 2 inches thick. The subsurface layer is yellowish brown loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown sandy clay loam, the middle parts are strong brown clay loam and red gravelly clay loam, and the lower part is red and yellowish red clay loam.

Included with this soil in mapping are areas of soils with slopes of more than 25 percent, soils that have stones on the surface, and soils with a surface layer of gravelly loam. Also included are a few small areas of soils with a restrictive layer in the subsoil. Included soils make up about 10 percent of this unit.

The permeability of this Nolichucky soil is moderate, and the available water capacity is moderate. Surface runoff is rapid. The surface layer of the soil is low in content of organic matter, and the soil is low in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid.

Most areas of this soil are in permanent pasture or hay. Some areas are in woodland.

Slope makes this soil poorly suited to cultivated crops commonly grown in the county and is the main limitation for nonfarm use.

This soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, yellow poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope limits safe operation of heavy timber equipment.

The capability subclass is IVe.

30C—Nolichucky very stony sandy loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on ridges and hilltops and in broad drainageways. Slopes are smooth. The areas of this soil commonly are irregularly shaped and range from 5 to 100 acres. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of this soil is brown gravelly sandy loam about 2 inches thick. The subsurface layer is yellowish brown gravelly sandy loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown sandy clay loam, the middle parts are strong brown clay loam and red gravelly clay loam, and the lower part is red and yellowish red clay loam.

Included with this soil in mapping are areas where stones cover less than 3 percent of the surface and areas where stones cover 15 to 50 percent of the surface. Also included are small areas of soils on toe slopes and benches that have a restrictive layer in the subsoil and small areas of Jefferson soils. Included soils make up about 10 percent of this unit.

The permeability of this Nolichucky soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The surface layer of the soil is low in content of organic matter, and the soil is low in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid.

Most areas of this soil are in permanent pasture or woodland.

The stones on the surface make this soil generally unsuitable for cultivated crops. The hazard of erosion is severe in cultivated areas and in areas with no plant cover.

This soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a desirable mixture of grasses and legumes, removing the stones, and the prevention of overgrazing are the main pasture management concerns. The use of proper stocking rates and rotational and deferred grazing are the chief pasture management practices.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, shortleaf pine, and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled. The stones on the surface limit safe operation of heavy equipment.

Slope and the stones on the surface are the main limitations of the soil for nonfarm uses.

The capability subclass is VIs.

30D—Nolichucky very stony sandy loam, 15 to 30 percent slopes. This soil is very deep, moderately steep to steep, and well drained. It is on side slopes of ridges. Slopes are smooth. The areas of this soil commonly are irregularly shaped and range from 5 to 500 acres. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of this soil is brown gravelly sandy loam about 2 inches thick. The subsurface layer is yellowish brown gravelly sandy loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown sandy clay loam, the middle parts are strong brown clay loam and red gravelly clay loam, and the lower part is red and yellowish red clay loam.

Included with this soil in mapping are areas where stones cover less than 3 percent of the surface and areas where stones cover 15 to 50 percent of the surface. Also included are small areas of soils on toe slopes and benches that have a restrictive layer in the subsoil and small areas of Jefferson soils. Included soils make up about 10 percent of this unit.

The permeability of this Nolichucky soil is moderate, and the available water capacity is moderate. Surface runoff is rapid. The surface layer of the soil is low in content of organic matter, and the soil is low in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid.

Most areas of this soil are in permanent pasture or woodland.

Slope and the stones on the surface make this soil generally unsuited to cultivated crops. The hazard of erosion is very severe.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a desirable mixture of grasses and legumes, removing the stones, and the prevention of overgrazing are the main pasture management concerns. The use of proper stocking rates and rotational and deferred grazing are the chief pasture management practices.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, shortleaf pine, and yellow-poplar. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the stones on the surface limit safe operation of heavy timber equipment and are the main limitations for nonfarm use.

The capability subclass is VIs.

30F—Nolichucky very stony sandy loam, 30 to 65 percent slopes. This soil is very deep, steep to very steep, and well drained. It is on side slopes of ridges. Slopes are smooth. The areas of this soil commonly are irregularly shaped and range from 10 to 1,000 acres. Stones at least 10 inches in diameter cover 3 to 15 percent of the surface.

Typically, the surface layer of this soil is brown gravelly sandy loam about 2 inches thick. The subsurface layer is yellowish brown gravelly sandy loam 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown sandy clay loam, the middle parts are strong brown clay loam and red gravelly clay loam, and the lower part is red and yellowish red clay loam.

Included with this soil in mapping are areas where stones cover less than 3 percent of the surface. Also included are areas of Jefferson soils on the upper side slopes of ridges. Included soils make up about 10 percent of this unit.

The permeability of this Nolichucky soil is moderate, and the available water capacity is moderate. Surface runoff is very rapid. The surface layer of the soil is low in content of organic matter, and the soil is low in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. In unlimed areas the soil is very strongly acid or strongly acid.

Most areas of this soil are in woodland. A few areas are in permanent pasture.

Slope and the stones on the surface make this soil generally unsuited to farming and are the main limitations for nonfarm use.

The potential productivity for trees on this soil is moderately high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. Slope and the stones on the surface limit safe operation of heavy timber equipment.

The capability subclass is VIIs.

31C—Poplimento silt loam, 7 to 15 percent slopes. This soil is deep, strongly sloping, and well drained. It is on hilltops and smooth side slopes. The areas of this soil commonly are irregularly shaped and range from 5 to 15 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 7 inches thick. The subsoil is 48 inches thick. The upper part of the subsoil is yellowish brown silty clay loam, the middle part is reddish yellow clay, and the lower part is brownish yellow shaly clay and very shaly clay. The substratum is very shaly clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of soils that have stones on the surface or that have a surface layer of cherty silt loam. Also included are a few areas of well drained Frederick soils. Included soils make up about 15 percent of this unit.

The permeability of this Poplimento soil is moderately slow, and the available water capacity is moderate. Surface runoff is medium. The surface layer is low in content of organic matter. The subsoil has a high shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. The soil is medium in natural fertility. In unlimed areas it ranges from very strongly acid through moderately acid in the surface layer and upper part of the subsoil, and from strongly acid through slightly acid in the lower part of the subsoil.

Most areas of this soil are in permanent pasture or hay. Some areas are in woodland.

This soil is suited to cultivated crops commonly grown in the area, but the erosion hazard is severe in areas with no plant cover. Conservation tillage and the use of cover crops and grasses and legumes in the cropping system are practices that help to control erosion in cultivated areas and help to increase organic matter content and maintain tilth. Mixing organic matter and crop residue into the soil and plowing when the soil is at the proper moisture content also are practices that help to maintain tilth.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, black walnut, or shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. This soil is soft during the late fall and early spring, limiting the use of some types of heavy timber equipment.

Slope and the permeability are the main limitations of the soil for nonfarm uses. The subsoil is soft when wet, limiting the use of equipment or vehicles on unpaved areas.

The capability subclass is IIIe.

31D—Poplimento silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on smooth side slopes of hills and ridges. The areas of this soil commonly are irregularly shaped and range from 10 to 25 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 7 inches thick. The subsoil is 48 inches thick. The upper part of the subsoil is yellowish brown silty clay loam, the middle part is reddish yellow clay, and the lower part is brownish yellow shaly clay and very shaly clay. The substratum is very shaly clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of soils that have stones on the surface or that have a surface layer of cherty silt loam. Also included are a few areas of rock outcrop and areas of well drained Frederick soils. Included areas make up about 15 percent of this unit.

The permeability of this Poplimento soil is moderately slow, and the available water capacity is moderate. Surface runoff is rapid. The surface layer is low in content of organic matter. The subsoil has a high shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. The soil is medium in natural fertility. In unlimed areas it ranges from very strongly acid through moderately acid in the surface layer and upper part of the subsoil, and from strongly acid through slightly acid in the lower part of the subsoil.

Most areas of this soil are in permanent pasture or hay. Some areas are in woodland.

Slope and a very severe erosion hazard make this soil poorly suited to cultivated crops.

This soil is suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads on the contour helps to reduce runoff and erosion. This soil is soft during the late fall and early spring, limiting the use of some types of heavy timber equipment.

Slope and the permeability are the main limitations of the soil for nonfarm uses. The subsoil is soft when wet, limiting the use of equipment and vehicles on unpaved areas.

The capability subclass is IVe.

31E—Poplimento silt loam, 25 to 35 percent slopes. This soil is very deep, steep, and well drained. It is on smooth side slopes of hills and ridges. The areas of this soil commonly are irregularly shaped and range from 10 to 20 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 7 inches thick. The subsoil is 48 inches thick. The upper part of the subsoil is yellowish brown silty clay loam, the middle part is reddish yellow clay, and the lower part is brownish yellow shaly clay and very shaly clay. The substratum is very shaly clay to a depth of 60 inches or more.

Included with this soil in mapping are a few areas of soils that have stones on the surface or that have a surface layer of cherty silt loam. Also included are a few areas of rock outcrop and areas of well drained Frederick soils. Included areas make up about 15 percent of this unit.

The permeability of this Poplimento soil is moderately slow, and the available water capacity is moderate. Surface runoff is very rapid. The surface layer is low in content of organic matter. The subsoil has a high shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches. The soil is medium in natural fertility. In unlimed areas it ranges from very strongly acid through moderately acid in the surface layer and upper part of the subsoil, and from strongly acid through slightly acid in the lower part of the subsoil.

Most areas of this soil are in permanent pasture or woodland.

Slope makes this soil generally unsuited to cultivated crops.

This soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for eastern white pine, yellow-poplar, and shortleaf pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads on the contour helps to reduce runoff and erosion. This soil is soft during the late fall and early spring, limiting the use of some types of heavy timber equipment. Slope further limits safe operation of such equipment.

Slope and the permeability are the main limitations of the soil for nonfarm uses. The subsoil is soft when wet, limiting the use of equipment and vehicles on unpaved areas.

The capability subclass is VIe.

32F—Rock outcrop-Berks complex, 30 to 80 percent slopes. This unit consists of steep and very steep, moderately deep, well drained Berks soils and rock outcrop on side slopes of hills and ridges. The areas are irregularly shaped and range from 5 to 150 acres. They are about 65 percent rock outcrop, 30 percent Berks shaly silt loam, and 5 percent other soils. The soils and rock are in such an intricate pattern that it was not practical to map them separately.

Typically, the surface layer of the Berks soil is very dark grayish brown shaly silt loam 2 inches thick. The subsoil is 16 inches thick. The upper part of the subsoil is yellowish brown shaly silt loam, and the lower part is reddish brown very shaly silt loam. The substratum is reddish yellow very shaly silt loam 5 inches thick. Shale and sandstone bedrock is at a depth of 23 inches.

Included with this soil in mapping are small areas of Gilpin soils.

The permeability of these Berks soils is moderate or moderately rapid, and the available water capacity is very low. Surface runoff is rapid to very rapid. The surface layer is low to moderate in content of organic matter. The soil is low in natural fertility and is very strongly acid or strongly acid. The rooting zone and depth to bedrock range from 20 to 30 inches but typically are less than 25 inches. The subsoil has a low shrink-swell potential.

Slope, the areas of rock outcrop, and the depth to bedrock make this unit generally unsuitable for farming and are major limitations for nonfarm use.

The potential productivity for trees on the Berks soils is moderately high on north-facing slopes and moderate on south-facing slopes. Droughtiness on the south-facing slopes during the growing season causes a high rate of seedling mortality. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The rock outcrops and the slope limit safe operation of heavy timber equipment.

The capability subclass is VIIIs.

33D—Sequoia silt loam, 10 to 30 percent slopes. This soil is moderately deep, sloping to steep, and well drained. It is on smooth side slopes of hills and ridges. The areas of this soil commonly are irregularly shaped and range from 5 to 20 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 7 inches thick. The subsoil is yellowish red and is 25 inches thick. The upper part of the subsoil is silty clay loam, and the lower part is silty clay. The substratum is light olive brown, weathered shale 41 inches thick. Hard shale bedrock is at a depth of 73 inches.

Included with this soil in mapping are a few small areas of severely eroded soils. Also included are areas of soils with a subsoil of silt loam and Sequoia soils that have stones on the surface. Included soils make up 5 to 10 percent of this unit.

The permeability of this Sequoia soil is moderately slow, and the available water capacity is low or moderate. Surface runoff is rapid. The surface layer is low in content of organic matter. The soil is low in natural fertility and is very strongly acid or strongly acid. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to soft shale commonly are 20 to 40 inches, and the depth to hard shale is more than 60 inches.

Most areas of this soil are in permanent pasture or hay. Some areas are in woodland.

Slope makes this soil generally unsuited to cultivated crops commonly grown in the county. The hazard of erosion is moderate to severe.

This soil is moderately well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is moderately high, especially for mixed hardwoods. The soil is managed primarily for eastern white pine and Virgnia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope of the soil limits safe operation of heavy timber equipment.

Slope, low strength, and the shirnk-swell potential are the main limitations of the soil for nonfarm use.

The capability subclass is IVe.

33F—Sequoia silt loam, 30 to 65 percent slopes. This soil is moderately deep, steep to very steep, and well drained. It is on smooth side slopes of ridges. The areas of this soil commonly are irregularly shaped and range from 10 to 25 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 7 inches thick. The subsoil is yellowish red and is 25 inches thick. The upper part of the subsoil is silty clay loam, and the lower part is silty clay. The substratum is light olive brown, weathered shale 41 inches thick. Hard shale bedrock is at a depth of 73 inches.

Included with this soil in mapping are a few small areas of severely eroded soils. Also included are areas of soils with a subsoil of silt loam and Sequoia soils that have stones on the surface. Included soils make up 5 to 10 percent of this unit.

The permeability of this Sequoia soil is moderately slow, and the available water capacity is low or moderate. Surface runoff is very rapid. The surface layer is low in content of organic matter. The soil is low in natural fertility and is very strongly acid or strongly acid. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to soft shale commonly are 20 to 40 inches, and the depth to hard shale is more than 60 inches.

Most areas of this soil are wooded. Some areas are used for pasture.

Slope makes this soil generally unsuited to cultivated crops and poorly suited to pasture and is the main limitation for nonfarm use. The hazard of erosion in disturbed areas is very severe.

The potential productivity for trees on this soil is moderately high, especially for mixed hardwoods. The soil is managed primarily for eastern white pine and Virginia pine. Seeds and seedlings survive and grow well if competing vegetation is controlled. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion. The slope of the soil limits safe operation of heavy timber equipment.

The capability subclass is VIIe.

34—Slickens, nearly level. This unit consists of accumulations of fine-textured material that has undergone chemical treatment. Examples are precipitate and sludge from hydroelectric plants. Slickens are mainly in specially constructed basins or ponds. Slopes range from 0 to 3 percent.

Included with this unit in mapping are excavated areas and filled areas.

This unit has little or no suitability for crops, trees, or other uses.

This unit is not assigned to a capability subclass.

35B—Timberville Variant loam, 2 to 7 percent slopes. This soil is very deep, gently sloping, and well drained. It is commonly in long, narrow areas along drainageways. The areas of this soil range from 3 to 50 acres. They are subject to frequent, very brief flooding early in spring but generally are not flooded during the growing season.

Typically, the surface layer of this soil is dark yellowish brown loam about 8 inches thick. The subsoil is strong brown and extends to a depth of 60 inches or more. The upper part of the subsoil is loam, the middle part is clay loam, the lower part is cherty clay loam.

Included with this soil in mapping are small areas in mountain valleys of soils that have a surface layer of gravelly loam or cobbly loam. Included soils make up 5 to 10 percent of this unit.

The permeability of this Timberville Variant soil is moderate, and the available water capacity is moderate or high. Surface runoff is slow to medium. The surface layer is moderate in content of organic matter. The soil is medium in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches, but a seasonal high water table is at a depth of 36 inches. The soil is slightly acid or neutral in the surface layer, moderately acid through neutral in the upper part of the subsoil, and strongly acid through slightly acid in the lower part of the subsoil.

Most areas of this soil are in cultivated crops or pasture, and the soil is classified as prime farmland in this county. Some areas are in woodland.

This soil is well suited to cultivated crops commonly grown in the county, but flooding occasionally damages crops. Conservation tillage, the use of cover crops and grasses and legumes in the cropping system, and the use of crop residue are practices that help to maintain organic matter content and tilth, help to control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for yellow-poplar and black walnut. Seeds and seedlings survive and grow well if competing vegetation is controlled. Frequent flooding in the spring sometimes delays logging operations.

Flooding is the main limitation of the soil for nonfarm use.

The capability subclass is IIw.

35C—Timberville Variant loam, 7 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is commonly in irregularly shaped areas at the head of drainageways. The areas of this soil range from 5 to 15 acres. They are subject to occasional flooding.

Typically, the surface layer of this soil is dark yellowish brown loam about 8 inches thick. The subsoil is strong brown and extends to a depth of 60 inches or more. The upper part of the subsoil is loam, the middle part is clay loam, and the lower part is cherty clay loam.

Included with this soil in mapping are small areas in mountain valleys of soils that have a surface layer of gravelly loam or cobbly loam. Included soils make up 5 to 10 percent of this unit.

The permeability of this Timberville Variant soil is moderate, and the available water capacity is moderate or high. Surface runoff is medium. The surface layer is moderate in content of organic matter. The soil is medium in natural fertility. The subsoil has a moderate shrink-swell potential. The rooting zone and depth to bedrock are more than 60 inches, but a seasonal high water table is at a depth of 36 inches. The soil is slightly acid or neutral in the surface layer, moderately acid through neutral in the upper part of the subsoil, and strongly acid through slightly acid in the lower part.

Most areas of this soil are in cultivated crops or pasture. Some areas are in woodland.

This soil is moderately well suited to cultivated crops commonly grown in the county. Conservation tillage, the use of cover crops and grasses and legumes in the cropping system, and the use of crop residue are practices that help to maintain organic matter content and tilth, help to control erosion, reduce crusting, and increase water infiltration.

This soil is well suited to pasture and hay crops commonly grown in the county. Establishing and maintaining a mixture of grasses and legumes, rotational and deferred grazing, and the use of lime and fertilizer are the main pasture management practices. If the pasture is overgrazed, runoff and the hazard of erosion increase.

The potential productivity for trees on this soil is high. The soil is managed primarily for yellow-poplar and black walnut. Seeds and seedlings survive and grow well if competing vegetation is controlled. Occasional flooding in the early spring sometimes delays logging operations.

Slope and flooding are the main limitations of the soil for nonfarm use.

The capability subclass is IIIe.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed by using acceptable farming methods. Prime farmland produces the highest yields with minimal input of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban or built-up land or water areas. It must either be used for producing food or fiber or be available for those uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season and acceptable levels of acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope range is mainly from 0 to 7 percent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 10,300 acres, or nearly 6 percent of the area covered in this survey, meets the soil requirements for prime farmland.

A recent trend in land use in some parts of the survey area has been toward the loss of some prime farmlands to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate and usually are less productive.

The soil map units that make up prime farmland in Giles County are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The number of farms in Giles County has decreased since 1970, but the average-size farm and the total acreage in farms have increased. The 1978 Agricultural Census Report lists 332 farms in the county, and the average size is 217 acres. Beef cattle and hay are the two major sources of farm income. Two other main sources are sheep and corn.

Controlling erosion is the major concern on nearly all of the cropland and pasture in the county. Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Second, soil erosion on farmland results in sedimentation of streams. Thus, control of erosion increases productivity and minimizes the pollution of streams, thereby improving the quality of water for municipal use, for recreation, and for fish and wildlife.

Loss of the surface layer is especially damaging to soils with a clayey subsoil, such as Braddock, Carbo, Frederick, and Poplimento soils. It is also damaging to soils with limited depth to bedrock, for example, Berks, Lehew, and Wallen soils.

Erosion-control practices provide a protective plant cover, reduce runoff, and increase infiltration. A cropping system that keeps the plant cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legumes and grass forage crops in the cropping system reduce erosion on sloping land, provide nitrogen to the soil, and improve tilth. Conservation tillage and leaving crop residue on the surface help to increase infiltration and reduce the hazards of runoff and erosion.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are not used in this soil survey.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Norman O. Wilson, forester, Soil Conservation Service, helped to prepare this section.

A forest mainly of second-growth hardwoods, eastern white pine, and Virginia pine covers about 73 percent of the land area in the county. Most of the woodland is in remote areas that are too steep or too stony for farming. Many of the wooded areas have been cut or burned, or both, and have undergone natural regeneration. The result is a forest of competitive, less desirable species that are difficult to place in well defined forest-cover types.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

The area in the vicinity of Sinking Creek provides exceptional habitat for fish and wildlife; the local streams support native brook trout, and the valleys contain wild turkey, deer, grouse, squirrel, bobcat, raccoon, and a wide variety of songbirds. The Nolichucky, Frederick, and Carbo soils are dominant in the valleys, and the Gilpin, Lehew, and Wallen soils are on the nearby mountain. The Jefferson National Forest is inhabited by black bear, deer, and wild turkey.

Wolf Creek and Walker Creek support native populations of brook trout and largemouth and smallmouth bass. The surrounding valleys and mountains have large populations of grouse, deer, beaver, mink, and songbirds.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are tall fescue, timothy, orchardgrass, red clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are broom sedge, goldenrod, beggarweed, ragweed, and burdock.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are elderberry, autumn-olive, and crabapple.

Coniferous plants furnish browse, buds, and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, cedar, and hemlock.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, cattail, pickerel weed, arrowhead, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadow vole, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, frogs, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 18 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of selected soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that have a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allegheny Series

The soils of the Allegheny series are very deep and well drained. They formed in alluvium derived from uplands underlain by limestone, shale, and sandstone. The soils are on low terraces. Slopes range from 2 to 15 percent.

Allegheny soils commonly are near Braddock, Chagrin, and Frederick soils. The Allegheny soils have a yellower subsoil than the Braddock soils, have an argillic horizon which is not typical in the Chagrin soils, contain less clay in the subsoil than the Braddock or Frederick soils, and have a thinner solum than the Frederick soils.

Typical pedon of Allegheny loam, 2 to 7 percent slopes, 2 miles south of Staffordsville, 100 yards east of Big Walker Creek:

Ap—0 to 7 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine and medium roots; many fine and medium pores; slightly acid; abrupt smooth boundary.

Bt1—7 to 13 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine and medium pores; thin patchy clay films; 5 percent rounded sandstone fragments; slightly acid; clear wavy boundary.

Bt2—13 to 27 inches; strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; firm, sticky, slightly plastic; common fine and medium roots; common fine and medium pores; few concretions; thin patchy clay films; 5 percent rounded sandstone fragments; strongly acid; clear wavy boundary.

Bt3—27 to 39 inches; strong brown (7.5YR 5/8) clay loam; weak fine and medium subangular blocky structure; firm, sticky, slightly plastic; few fine and medium roots; few fine and medium pores; few concretions; thin patchy clay films; 5 percent rounded sandstone fragments; strongly acid; clear wavy boundary.

C—39 to 60 inches; strong brown (7.5YR 5/8) clay loam; common fine faint yellowish brown (10YR 5/6) mottles; massive; firm, sticky, slightly plastic; 10 percent rounded sandstone fragments; strongly acid.

The solum ranges from 30 to 60 inches in thickness. The depth to bedrock is more than 5 feet. Rounded rock fragments make up 0 to 15 percent of the soil. The soil in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, fine sandy loam, or silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 6 or 8. It is sandy clay loam or clay loam.

The C horizon is brown, gray, or yellow and is clay loam or sandy clay loam.

Bailegap Series

The soils of the Bailegap series are deep and well drained. They formed in residuum weathered from sandstone, siltstone, and interbedded shale. The soils are on rounded hills and the sides and tops of ridges in the Appalachian Mountains. Most areas are at an elevation of more than 3,000 feet. Slopes range from 2 to 65 percent.

Bailegap soils commonly are near Jefferson and Lily soils. The Bailegap soils are redder in the subsoil and contain more silt throughout than the Jefferson or Lily soils. The Bailegap soils are not as deep to bedrock as the Jefferson soils and are deeper to bedrock than the Lily soils.

Typical pedon of Bailegap flaggy loam, in an area of Lily-Bailegap complex, very stony, 35 to 65 percent slopes, on the north side of Big Mountain on VA Route 804, 2.5 miles south of VA Route 635:

Oi—1/2 inch to 0; loose leaves and twigs and partially decomposed organic material.

A—0 to 2 inches; dark brown (7.5YR 4/2) flaggy loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine vesicular pores; 10 percent gravel and 20 percent flagstones; very strongly acid; abrupt smooth boundary.

E—2 to 8 inches; reddish brown (5YR 5/3) channery silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine vesicular pores; 10 percent gravel and 20 percent channers; very strongly acid; clear wavy boundary.

Bt1—8 to 20 inches; reddish brown (2.5YR 4/4) gravelly silt loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine and medium roots; common very fine and fine vesicular pores; 30 percent gravel; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt2—20 to 29 inches; reddish brown (2.5YR 4/4) cobbly silt loam; moderate fine subangular blocky structure; firm, sticky, plastic; few fine and medium roots; few very fine and fine vesicular pores; 15 percent gravel and 20 percent angular cobblestones; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt3—29 to 37 inches; reddish brown (2.5YR 4/4) very cobbly silt loam; moderate fine subangular blocky structure; firm, sticky, plastic; few fine and medium roots; few very fine and fine vesicular pores; 20 percent gravel and 30 percent angular cobblstones; thin patchy clay films; very strongly acid; gradual irregular boundary.

Bt4—37 to 42 inches; reddish brown (2.5YR 4/4) extremely cobbly silt loam; weak fine angular blocky structure; firm, slightly sticky, slightly plastic; few fine and medium roots; few very fine and fine vesicular pores; 40 percent gravel and 40 percent angular cobblestones; thin patchy clay films; very strongly acid; abrupt irregular boundary.

Cr—42 to 58 inches; fractured red sandstone bedrock that crushes to sandy loam; weak fine granular structure in cracks; very strongly acid.

R—58 inches; red sandstone bedrock.

The solum thickness and depth to bedrock range from 40 to 60 inches. Rock fragments of sandstone gravel, flagstones, or angular cobblestones make up 3 to 30 percent of the A horizon, 10 to 35 percent of the upper part of the B horizon, and 10 to 80 percent of the lower part of the B horizon and the C horizon. The soil is very strongly acid in unlimed areas.

The A horizon has hue of 5YR or 7.5YR, value of 3 through 5, and chroma of 2 or 3. In the fine-earth fraction it is loam, silt loam, or sandy loam.

The E horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 3 or 4. In the fine-earth fraction it is loam, silt loam, or sandy loam.

The Bt horizon has hue of 10R through 5YR, value of 4 through 6, and chroma of 3 or 4. In the fine-earth fraction it is sandy loam, loam, or silt loam.

The C horizon has hue of 2.5YR or 5YR, value of 4 through 6, and chroma of 3 or 4. In the fine-earth fraction it is loamy sand, sandy loam, or loam or saprolite that crushes to those textures.

Berks Series

The soils of the Berks series are moderately deep and well drained. They formed in material weathered from acid shale and fine-grained sandstone. The soils are on high mountains that have narrow to broad ridges and steep side slopes. Slopes range from 10 to 65 percent.

Berks soils commonly are near Gilpin and Sequoia soils. The Berks soils are not as red as and contain less clay than the Sequoia soils and contain more rock fragments than the Gilpin soils.

Typical pedon of Berks shaly silt loam, 10 to 30 percent slopes, 1/2 mile from the intersection of VA Routes 643 and 645 on VA Route 645, about 100 yards north of VA Route 645:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) shaly silt loam; weak fine granular structure; very friable, slightly sticky, nonplastic; many fine and medium roots; few fine pores; 20 percent shale and sandstone fragments; strongly acid; abrupt smooth boundary.

E—2 to 8 inches; yellowish brown (10YR 5/4) shaly silt loam; moderate fine granular structure; friable, slightly sticky, nonplastic; common fine and medium roots; many fine pores; 20 percent shale and sandstone fragments; strongly acid; clear wavy boundary.

Bw—8 to 18 inches; reddish yellow (7.5YR 6/6) very shaly silt loam; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine medium and coarse roots and many fine pores; 55 percent shale and sandstone fragments; very strongly acid; clear smooth boundary.

C—18 to 23 inches; reddish yellow (7.5YR 6/6) extremely shaly silt loam; massive; firm, slightly sticky, slightly plastic; few fine pores; 80 percent shale and sandstone fragments; very strongly acid; abrupt smooth boundary.

R—23 inches; acid shale and fine-grained sandstone bedrock.

The solum thickness ranges from 18 to 25 inches and the depth to bedrock from 20 to 30 inches. Shale and sandstone fragments make up 15 to 65 percent of individual horizons in the solum and 70 to 85 percent of the C horizon. In unlimed areas the soil is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 or 5, and chroma of 2 through 4. In the fine-earth fraction it is silt loam or loam.

The E horizon has hue of 10YR, value of 3 or 5, and chroma of 3 or 4. In the fine-earth fraction it is silt loam or loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. In the fine-earth fraction it is silt loam or loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 or 6.

Braddock Series

The soils of the Braddock series are very deep and well drained. They formed in old alluvial deposits derived from igneous and sedimentary materials. The soils are on high terraces. Slopes range from 2 to 35 percent.

Braddock soils commonly are near Allegheny and Frederick soils but have a thinner solum than the Frederick soils and contain more clay in the subsoil than the Allegheny soils.

Typical pedon of Braddock sandy loam, 2 to 7 percent slopes, in the town of Rich Creek, 200 yards northwest of VA Route 645:

Ap—0 to 6 inches; dark brown (10YR 4/3) sandy loam; moderate fine granular structure; friable, nonsticky, nonplastic; many fine roots; few fine pores; 2 percent gravel; slightly acid; abrupt wavy boundary.

E—6 to 11 inches; yellowish brown (10YR 5/6) sandy loam; weak medium platy structure; friable, slightly brittle, nonsticky, nonplastic; common fine roots; few fine pores; 20 percent light olive brown (2.5Y 5/4) Ap material; 2 percent gravel; moderately acid; clear wavy boundary.

Bt1—11 to 16 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; few fine pores; 2 percent yellowish brown (10YR 5/6) E material; 2 percent gravel; thin continuous red (2.5YR 5/8) clay films; strongly acid; clear wavy boundary.

Bt2—16 to 23 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; few fine pores; 2 percent gravel; thin continuous red (2.5YR 4/6) clay flms; very strongly acid; clear wavy boundary.

Bt3—23 to 36 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; few fine pores; 2 percent gravel; thin continuous dark red (2.5YR 3/6) clay films; very strongly acid; clear wavy boundary.

Bt4—36 to 52 inches; red (2.5YR 4/8) clay; few medium prominent brownish yellow (10YR 6/8) and dark red (2.5YR 3/6) mottles; moderate medium subangular blocky structure; very firm, slightly brittle, sticky, slightly plastic; few fine roots; few fine pores; 2 percent gravel; thin continuous red (2.5YR 4/6) clay films; very strongly acid; clear wavy boundary.

Bt5—52 to 80 inches; red (2.5YR 4/8) clay loam; few medium distinct dark red (2.5YR 3/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; few fine pores; many highly weathered yellowish brown (10YR 5/8) sandstone fragments; 10 percent quartz gravel; thin continuous red (2.5YR 4/6) clay films; few mica flakes; very strongly acid.

The solum thickness and depth to bedrock are more than 60 inches. Igneous and metamorphic rock fragments make up 0 to 15 percent of the soil. In unlimed areas the soil is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 3 through 6. It is fine sandy loam, sandy loam, or loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. It is sandy loam or loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is clay loam or clay.

Some pedons have a C horizon that is variable in color and texture and generally is mottled or variegated.

Carbo Series

The soils of the Carbo series are moderately deep and well drained. They formed in the weathered products of argillaceous limestone. The soils are on upland areas characterized by numerous limestone outcrops and sinkholes. Slopes range from 2 to 65 percent.

Carbo soils commonly are near Frederick and Timberville Variant soils. The Carbo soils are not as deep to bedrock as and have a thinner solum than the Frederick soils and have more clay in the subsoil than the Timberville Variant soils.

Typical pedon of Carbo silty clay loam, in an area of Carbo-Rock outcrop complex, 25 to 65 percent slopes, 1.25 miles east of the intersection of VA Routes 608 and 777, on VA Route 608:

Ap—0 to 5 inches; brown (7.5YR 4/4) silty clay loam; moderate fine granular structure; friable, sticky, slightly plastic; many fine roots; neutral; clear smooth boundary.

Bt1—5 to 15 inches; strong brown (7.5YR 5/6) clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; few roots; continuous clay films; neutral; clear smooth boundary.

Bt2—15 to 25 inches; strong brown (7.5YR 5/6) clay; weak fine and medium subangular blocky structure; very firm, sticky, plastic; few roots; continuous clay films; neutral; abrupt smooth boundary.

R—25 inches; gray argillaceous limestone.

The depth to bedrock and the solum thickness range from 20 to 40 inches. Rock fragments of shale, limestone, or quartz make up 0 to 10 percent of the A horizon and 0 to 15 percent in the B horizon. The soil is slightly acid or neutral.

The A horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 3 or 4. It is silt loam or silty clay loam.

The B horizon has hue of 7.5YR, value of 5 or 6, and chroma of 6 or 8.

Chagrin Series

The soils of the Chagrin series are very deep and well drained. They formed in alluvium derived mainly from uplands underlain by limestone and shale and some sandstone. The soils are on flood plains. Slopes range from 0 to 2 percent.

Chagrin soils commonly are near Allegheny and Frederick soils. The Chagrin soils do not have the argillic horizon typical of the Allegheny and Frederick soils.

Typical pedon of Chagrin silt loam, 50 yards southwest of the bridge over Sinking Creek at Maybrook, on U.S. Route 460:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; neutral; clear smooth boundary.

Bw1—9 to 38 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; very friable, nonsticky, nonplastic; common fine roots; neutral; clear smooth boundary.

Bw2—38 to 42 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; very friable, nonsticky, nonplastic; neutral; clear smooth boundary.

2C—42 to 60 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; very friable, nonsticky, nonplastic; neutral.

The solum thickness ranges from 30 to 48 inches. The depth to bedrock is more than 5 feet. Rock fragments of gravel make up 0 to 10 percent of the soil. The soil is moderately acid through neutral.

The A horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. It is silt loam or loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, silt loam, or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4. It is fine sandy loam, loam, or silt loam.

Chagrin Variant

The soils of the Chagrin Variant are very deep and excessively drained. They formed in alluvium derived mainly from uplands underlain by limestone and shale and some sandstone. The soils are on flood plains along major and minor streams. Slopes range from 0 to 2 percent.

Chagrin Variant soils commonly are near Chavies Variant and Allegheny soils but contain less clay in the solum than those soils.

Typical pedon of Chagrin Variant loamy sand, about 300 yards west of the radio station on the north side of VA Route 100:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; very friable; neutral; abrupt smooth boundary.

A—9 to 14 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine and medium subangular blocky structure; very friable; neutral; clear smooth boundary.

AB—14 to 30 inches; dark brown (10YR 3/3) loamy sand; weak medium and coarse subangular blocky structure; three very thin lamellae that total 1/2 inch in thickness; very friable; neutral; clear smooth boundary.

A/Bt1—30 to 38 inches; A part—brown (10YR 4/3) loamy sand; single grain; B part—dark brown (10YR 3/3) sandy loam lamellae less than 1/2 inch thick and about 4 inches apart; neutral; clear smooth boundary.

A/Bt2—38 to 60 inches; A part—yellowish brown (10YR 5/4) loamy sand; single grain; B part—dark yellowish brown (10YR 3/4) loamy sand lamellae; two seams are 1/2 inch thick; others are less than 1/2 inch thick and total 3 inches in thickness; neutral; clear smooth boundary.

C—60 to 65 inches; yellowish brown (10YR 5/4) loamy sand; single grain; neutral.

The solum thickness ranges from 48 to 60 inches. The depth to bedrock is more than 60 inches. In unlimed areas the soil ranges from slightly acid through neutral.

The A horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 4. It is loamy sand or sandy loam.

The A/B horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 4. It is loamy sand or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 4. It is loamy sand or sand.

Chavies Variant

The soils of the Chavies Variant are very deep and well drained. They formed in alluvium derived mainly from uplands underlain by sandstone and shale. The soils are on low terraces along major and minor streams. Slopes range from 0 to 3 percent.

Chavies Variant soils commonly are near Chagrin Variant and Allegheny soils. The Chavies Variant soils contain more clay in the subsoil than the Chagrin Variant soils and less clay in the subsoil than the Allegheny soils.

Typical pedon of Chavies Variant sandy loam, on the Bluestone Reservation, approximately 1 mile from the West Virginia State line, 100 yards south of the New River:

Ap—0 to 11 inches; dark brown (10YR 3/3) sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many roots; common mica flakes; neutral; abrupt wavy boundary.

Bw—11 to 23 inches; brown (7.5YR 4/4) loamy fine sand; weak medium and coarse subangular blocky structure; very friable, nonsticky, nonplastic; common roots; common mica flakes; neutral; clear wavy boundary.

2Bt1—23 to 32 inches; brown (7.5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable, nonsticky, nonplastic; few roots; common mica flakes; thin patchy clay films and clay bridging; neutral; clear wavy boundary.

2Bt2—32 to 45 inches; brown (7.5YR 4/4) sandy loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly brittle, nonsticky, nonplastic; few roots; common mica flakes; thin continuous brown (10YR 5/3) clay films on faces of peds; few oxide stains; neutral; clear wavy boundary.

2Bt3—45 to 60 inches; brown (7.5YR 4/4) sandy loam; few medium distinct brown (7.5YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm, slightly brittle, nonsticky, nonplastic; few roots; common mica flakes; 5 percent cobblestones; thin patchy clay films and clay bridging; neutral.

The solum thickness is more than 40 inches. The depth to bedrock is more than 5 feet. The content of rock fragments ranges from 0 to 5 percent throughout the solum. The soil is neutral or mildly alkaline.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is sandy loam, loamy sand, or loamy fine sand.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. It is loamy fine sand, loamy sand, sandy loam, or fine sandy loam. Some pedons do not have mottles below a depth of 40 inches.

Cotaco Series

The soils of the Cotaco series are very deep and moderately well drained. They formed in old alluvial material washed mainly from areas of sandstone and shale. The soils are on high terraces along major streams. Slopes range from 2 to 15 percent.

Cotaco soils commonly are near Braddock soils but contain less clay and are not as red.

Typical pedon of Cotaco loam, 7 to 15 percent slopes, about 1/2 mile north of the summit of Brushy Mountain, 2 miles southwest of the pond at the Dismal Creek headwaters, about 1 1/3 miles east of Wapiti Shelter along the Appalachian Trail, on the east side of road:

Oi—1 inch to 0; loose leaves and twigs and partially decomposed organic material.

A—0 to 1 inch; dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; many fine and medium vesicular pores; 10 percent channery sandstone fragments; very strongly acid; abrupt smooth boundary.

E—1 to 8 inches; brown (10YR 5/3) loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak fine granular structure; very friable, nonsticky, nonplastic; common fine and medium roots; few fine and medium vesicular pores; 10 percent channery sandstone fragments; very strongly acid; clear wavy boundary.

BE—8 to 11 inches; light yellowish brown (10YR 6/4) loam; common medium faint brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; common fine and medium roots; few fine and medium vesicular pores; 10 percent channery sandstone fragments; very strongly acid; clear wavy boundary.

Bt1—11 to 15 inches; brownish yellow (10YR 6/6) clay loam; moderate fine subangular blocky structure; firm, slightly sticky, slightly plastic; few fine and medium roots; few fine and medium vesicular pores; 5 percent channery sandstone fragments; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt2—15 to 25 inches; brownish yellow (10YR 6/6) clay loam; moderate fine subangular blocky structure; firm, sticky, plastic; few fine and medium roots; few fine and medium vesicular pores; 2 percent channery sandstone fragments; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt3—25 to 35 inches; brownish yellow (10YR 6/6) clay loam; common fine distinct light olive gray (5Y 6/2) mottles and few fine distinct strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm, sticky, plastic; few fine and medium roots; few fine and medium vesicular pores; 2 percent sandstone fragments; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt4—35 to 47 inches; strong brown (7.5YR 5/8) clay loam; common fine prominent light gray (5Y 7/1) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; 2 percent sandstone fragments; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt5—47 to 60 inches; light yellowish brown (2.5Y 6/4) clay loam; many fine distinct light olive gray (5Y 6/2) and strong brown (7.5YR 5/8) mottles; weak medium angular blocky structure; firm, sticky, plastic; 2 percent sandstone fragments; thin patchy clay films; very strongly acid.

The solum thickness is more than 30 inches. The depth to bedrock is more than 60 inches. The content of rock fragments of sandstone or shale ranges from 2 to 15 percent. The soil in unlimed areas ranges from extremely acid through strongly acid.

The A horizon has hue of 10YR, value of 4 or 6, and chroma of 2 through 4. It is fine sandy loam or loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 or 6, and chroma of 3 or 4. It is fine sandy loam or loam.

The B horizon has hue of 7.5YR, 10YR, or 2.5Y; value of 5 or 6; and chroma of 4 through 8. It is loam or clay loam.

Drall Series

The soils of the Drall series are deep and excessively drained. They formed in material weathered from colluvial and residual sandstone. The soils are on high mountains and steep side slopes. Slopes range from 10 to 65 percent.

Drall soils in this survey area are near and mapped only with Jefferson Variant soils but contain less clay in the solum than the Jefferson Variant soils.

Typical pedon of Drall cobbly loamy sand, in an area of Jefferson Variant and Drall soils, very stony, 10 to 30 percent slopes, about 1.5 miles west of Newport, 0.6 mile north on VA Route 606:

Oi—2 inches to 1 inch; thin layer of leaves and twigs.

Oe—1 inch to 0; very dark brown (10YR 2/2) decomposed forest litter.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) cobbly loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; many fine pores; 15 percent gravel; 20 percent stones and cobblestones; strongly acid; abrupt smooth boundary.

Bw1—2 to 9 inches; yellowish brown (10YR 5/6) cobbly loamy sand; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; many fine pores; 15 percent gravel; 20 percent stones and cobblestones; strongly acid; clear smooth boundary.

Bw2—9 to 24 inches; light yellowish brown (10YR 6/4) cobbly loamy sand; weak medium subangular blocky structure; loose, nonsticky, nonplastic; common fine and medium roots; many fine pores; 15 percent gravel; 20 percent cobblestones; strongly acid; gradual smooth boundary.

C—24 to 47 inches; brown (7.5YR 5/4) very cobbly sand; single grain; loose, nonsticky, nonplastic; few fine roots; common fine pores; 30 percent gravel; 25 percent cobblestones; strongly acid.

R—47 inches; partially weathered sandstone bedrock.

The solum ranges from 20 to 35 inches in thickness. The depth to bedrock ranges from 40 to 60 inches. The content of rock fragments of gravel, cobbles, and stones ranges from 30 to 65 percent in individual horizons and averages more than 35 percent in the control section. The soil is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 4. It is sandy loam or loamy sand in the fine-earth fraction.

The Bw horizon has hue of 10YR, value of 5 or 6, and chroma of 4 through 8. It is loamy sand or sand in the fine-earth fraction.

The C horizon ranges from reddish brown to yellowish brown. It is sand or loamy sand in the fine-earth fraction.

Faywood Series

The soils of the Faywood series are moderately deep and well drained. They formed in material weathered from interbedded shale and limestone bedrock and are in areas characterized by long, smooth ridges and deep, narrow drainageways. Slopes range from 10 to 65 percent.

Faywood soils commonly are near Carbo, Poplimento, and Sequoia soils. The Faywood soils contain less clay throughout the solum than the Carbo soils and are not as deep to bedrock as the Poplimento or Sequoia soils.

Typical pedon of Faywood silt loam, 30 to 65 percent slopes, approximately 2.4 miles north on VA Route 613 from the intersection of VA Routes 613 and 615, about 300 yards west of VA Route 613:

A—0 to 3 inches; dark brown (10YR 3/3) silt loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; many roots and pores; 5 percent shale fragments; neutral; clear wavy boundary.

Bt1—3 to 15 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable, sticky, slightly plastic; common roots and pores; thin continuous clay films; 10 percent shale fragments; neutral; clear wavy boundary.

Bt2—15 to 22 inches; strong brown (7.5YR 5/6) shaly silty clay; moderate fine and medium subangular blocky structure; firm, sticky, plastic; few roots; common pores; thick continuous clay films; 20 percent shale fragments, 2-inch-thick shale seam; neutral; clear wavy boundary.

Bt3—22 to 28 inches; strong brown (7.5YR 5/6) shaly silty clay; weak medium subangular blocky structure; firm, sticky, plastic; few roots and pores; thick patchy clay films; 30 percent shale fragments; neutral; abrupt wavy boundary.

C—28 to 36 inches; strong brown (7.5YR 5/6) extremely shaly silty clay; massive; firm, sticky, plastic; few roots; thin patchy clay films on shale fragments; 60 percent shale fragments, 1- to 2-inch-thick shale seams; neutral; abrupt smooth boundary.

R—36 inches; shale interbedded with limestone.

The solum thickness ranges from 20 to 36 inches. The depth to hard bedrock ranges from 20 to 40 inches. Channery-size fragments of shale and limestone make up 0 to 15 percent of the upper part of the solum, 0 to 35 percent of the lower part of the solum, and up to 60 percent of the C horizon. In some profiles the upper 20 inches of the solum is 5 to 10 percent highly weathered fine sandstone gravel. The soil is moderately acid through neutral.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. It is silt loam or silty clay loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. It is silty clay loam or silty clay in the fine-earth fraction.

The C horizon has hue of 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is silty clay in the fine-earth fraction.

The Faywood soils in this survey area are a taxadjunct to the Faywood series because of more rock fragments in the lower part of the solum and in the C horizon than defined for the range in the series. This difference does not significantly affect the use and management of the soils.

Fluvaquents

Fluvaquents in this survey area consist of very deep, poorly drained soils on large and small flood plains throughout the survey area. The soils formed in alluvium washed mainly from upland soils derived from interbedded acid sandstone and shale. Slopes range from 0 to 3 percent.

Fluvaquents commonly are near Chagrin Variant soils.

Because of the variability of Fluvaquents, a typical pedon is not given. The depth to sandstone bedrock is more than 60 inches. The soils are very strongly acid through mildly alkaline. Rounded fragments of sandstone make up 0 to 40 percent of the soil. The A horizon is up to 60 percent cobblestones and stones.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 through 3. In the fine-earth fraction it is sand, loamy sand, sandy loam, loam, or silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 1 through 4. The B horizon in the fine-earth fraction is sandy loam, loam, or silt loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 1 through 4. In the fine-earth fraction it is sand, loamy sand, sandy loam, loam or silt loam.

Frederick Series

The soils of the Frederick series are very deep and well drained. They formed in material weathered from dolomite and limestone. These soils are in areas characterized by low, rounded hills and foot slopes marked by a few outcrops of partially weathered dolomite or limestone. The hills and foot slopes are separated by narrow drainageways of intermittent streams. Slopes range from 2 to 60 percent.

Frederick soils commonly are near the Braddock, Carbo, and Nolichucky soils. The Frederick soils are deeper to bedrock than the Carbo or Braddock soils, have less clay than the Carbo soils, and have more clay than the Nolichucky soils.

Typical pedon of Frederick cherty silt loam, 15 to 25 percent slopes, about 1/2 mile south of Eggleston on VA Route 703, 100 yards east of road:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) cherty silt loam; moderate fine granular structure; friable, nonsticky, nonplastic; many fine roots; few fine pores; 25 percent chert fragments; slightly acid; abrupt smooth boundary.

AB—8 to 10 inches; A part—yellowish brown (10YR 5/4) silt loam, B part—reddish yellow (7.5YR 6/8) silty clay loam; moderate fine subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; few fine pores; 2 percent chert fragments; moderately acid; abrupt smooth boundary.

Bt1—10 to 16 inches; yellowish red (5YR 5/8) silty clay loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine pores; thin continuous reddish yellow (5YR 6/8) clay films; few black oxide coatings on peds; 2 percent chert fragments; strongly acid; clear wavy boundary.

Bt2—16 to 28 inches; yellowish red (5YR 5/8) clay; moderate fine and medium subangular blocky structure; firm, sticky, slightly plastic; few fine roots; few fine pores; thin continuous strong brown (7.5YR 5/8) clay films; 2 percent chert fragments; very strongly acid; clear wavy boundary.

Bt3—28 to 54 inches; yellowish red (5YR 5/8) clay; strong coarse and medium angular blocky structure; firm, sticky, slightly plastic; few fine pores; thick continuous strong brown (7.5YR 5/8) clay films; few medium prominent yellow (10YR 7/8) weathered saprolite fragments; 2 percent chert fragments; very strongly acid; gradual wavy boundary.

Bt4—54 to 80 inches; yellowish red (5YR 5/8) clay; strong coarse angular blocky structure; firm, sticky, slightly plastic; few fine pores; thick continuous strong brown (7.5YR 5/8) clay films; 2 percent chert fragments; very strongly acid.

The solum thickness and the depth to bedrock are more than 5 feet. The content of chert fragments ranges from 0 to 30 percent in the surface layer and 0 to 10 percent in the subsoil. The soil in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 6. The A horizon is loam or silt loam in the fine-earth fraction.

The AB horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. It is silt loam or silty clay loam. Some pedons have skeletans and degradations. Some pedons have a BE horizon with the same color and texture as the AB horizon.

The Bt horizon has hue mainly of 2.5YR through 5YR, value of 4 through 6, and chroma of 6 or 8. Some pedons have subhorizons with hue of 7.5YR. Some pedons have strong brown, yellowish red, reddish yellow, or brownish yellow mottles. The Bt horizon is silty clay loam, silty clay, or clay.

Gilpin Series

The soils of the Gilpin series are moderately deep and well drained. They formed in material weathered from acid shale. The soils are on long, narrow ridges and mountain side slopes. Slopes range from 7 to 65 percent.

Gilpin soils commonly are near Berks, Lehew, Lily, Nolichucky, and Poplimento soils. The Gilpin soils have a more developed B horizon than the Berks soils, contain more silt than the Lily soils, contain less clay in the subsoil than Poplimento soils, and have a thinner solum than the Nolichucky soils. The Gilpin soils formed in shale residuum, but the Lehew soils formed in sandstone residuum.

Typical pedon of Gilpin silt loam, in an area of Gilpin very stony silt loam, 30 to 65 percent slopes, 1/5 mile west of the Montgomery-Giles County line, 200 feet north of U.S. Route 460:

A—0 to 2 inches; dark brown (10YR 3/3) silt loam; moderate fine granular structure; friable, nonsticky, nonplastic; many fine roots; 5 percent weathered shale fragments; strongly acid; abrupt smooth boundary.

E—2 to 7 inches; yellowish brown (10YR 5/4) silt loam; moderate fine granular structure; friable, nonsticky, nonplastic; many fine roots; 10 percent weathered shale fragments; strongly acid; clear smooth boundary.

Bt—7 to 29 inches; reddish yellow (7.5YR 5/6) shaly silt loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, nonplastic; common fine roots; thin patchy clay films; 25 percent weathered shale fragments; strongly acid; clear wavy boundary.

C—29 to 34 inches; reddish yellow (7.5YR 6/8) extremely shaly silt loam; massive; friable, slightly sticky, nonplastic; 60 percent weathered shale fragments; strongly acid; abrupt smooth boundary.

Cr—34 inches; soft, light olive brown (2.5Y 5/4) acid shale bedrock.

The solum is 18 to 36 inches in thickness. The depth to soft bedrock is 20 to 40 inches. Shale fragments range in content from 5 to 30 percent in the solum and from 40 to 70 percent in the C horizon. The soil in unlimed areas ranges from extremely acid through strongly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. It is silt loam in the fine-earth fraction.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam in the fine-earth fraction.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 through 8. In the fine-earth fraction it is loam, silt loam, or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 through 7, and chroma of 4 through 8. It is silt loam or silty clay loam in the fine-earth fraction.

Jefferson Series

The soils of the Jefferson series are very deep and well drained. They formed in colluvium from soils formed in residuum of acid sandstone, shale, and siltstone. The soils are on mountainsides and foot slopes typically below sandstone escarpments. Slopes range from 0 to 65 percent.

Jefferson soils commonly are near Bailegap and Lily soils. The Jefferson soils are not as red in the subsoil as and contain less silt than the Bailegap soils and are deeper to bedrock than the Lily soils.

Typical pedon of Jefferson loam, in an area of Jefferson extremely stony loam, 15 to 35 percent slopes, approximately 2 miles west of the intersection of VA Routes 665 and 663, 400 feet north of VA Route 663:

Oe—2 inches to 0; partially decomposed oak leaves and twigs.

A—0 to 3 inches; dark brown (10YR 3/3) loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine roots; many fine pores; 10 percent angular and semirounded sandstone fragments; very strongly acid; clear wavy boundary.

BA—3 to 10 inches; strong brown (7.5YR 4/6) loam; moderate very fine subangular blocky structure; friable, nonsticky, nonplastic; many fine and medium roots; common fine pores; 5 percent semirounded and angular sandstone fragments; very strongly acid; clear smooth boundary.

Bt1—10 to 24 inches; strong brown (7.5YR 5/6) loam; moderate very fine subangular blocky structure; friable, slightly sticky, nonplastic; common very fine roots; common very fine pores; thin patchy clay films; 5 percent semirounded and angular sandstone fragments; very strongly acid; gradual wavy boundary.

Bt2—24 to 46 inches; yellowish red (5YR 5/6) very gravelly sandy loam; moderate very fine subangular blocky structure; very friable, nonsticky, nonplastic; common fine and medium roots; common very fine pores; thin patchy clay films; 35 percent semirounded and angular sandstone fragments; very strongly acid; clear smooth boundary.

2Bt3—46 to 72 inches; yellowish red (5YR 5/8) gravelly sandy clay loam; moderate very fine subangular blocky structure; friable, slightly sticky, slightly plastic; few very fine and medium roots; common very fine pores; thin patchy clay films; 20 percent semirounded and angular sandstone fragments; very strongly acid.

The solum thickness is more than 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments of angular and semirounded sandstone ranges from 5 to 35 percent to a depth of 3 feet and 20 to 80 percent below 3 feet. The soil in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The soil is loam in the fine-earth fraction.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 through 8. In the fine-earth fraction it is sandy loam, loam, or sandy clay loam.

The Jefferson soils in this survey area are a taxadjunct to the Jefferson series because they have a slightly thicker solum and are redder in the lower part of the solum than defined for the range in series. These differences do not significantly affect the use and management of the soils.

Jefferson Variant

The soils of the Jefferson Variant are very deep and well drained. They formed in colluvial material from acid sandstone. The soils are in areas characterized by high mountains and steep side slopes. Slopes range from 10 to 65 percent.

Jefferson Variant soils commonly are near Drall and Nolichucky soils. The Jefferson Variant soils contain more clay in the solum than the Drall soils and not as much clay as the Nolichucky soils.

Typical pedon of Jefferson Variant cobbly sandy loam, in an area of Jefferson Variant and Drall soils, very stony, 10 to 30 percent slopes, about 1.5 miles west of Newport on VA Route 605, about 0.6 mile north on VA Route 606:

A—0 to 2 inches; very dark gray (10YR 3/1) cobbly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; many fine pores; 20 percent rock fragments; strongly acid; abrupt smooth boundary.

E—2 to 9 inches; yellowish brown (10YR 5/8) cobbly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; many fine pores; 20 percent rock fragments; strongly acid; clear smooth boundary.

BE—9 to 17 inches; strong brown (7.5YR 5/6) cobbly sandy loam; weak fine subangular blocky structure; very friable, nonsticky, nonplastic; common fine and medium roots; many fine pores; 20 percent rock fragments; strongly acid; clear wavy boundary.

Bt1—17 to 27 inches; yellowish red (5YR 4/8) cobbly sandy loam; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine and medium roots; common fine pores; thin patchy clay films; 20 percent rock fragments; strongly acid; gradual wavy boundary.

Bt2—27 to 45 inches; yellowish red (5YR 5/8) cobbly sandy loam; moderate medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; few fine pores; thin patchy clay films; 20 percent rock fragments; strongly acid; clear wavy boundary.

C—45 to 65 inches; yellowish red (5YR 5/8) gravelly loamy sand; common medium distinct strong brown (7.5YR 5/8) mottles; massive; friable, nonsticky, nonplastic; 25 percent rock fragments; strongly acid; abrupt smooth boundary.

The solum is 40 to 60 inches thick. The depth to bedrock is more than 5 feet. Gravel- to stone-size rock fragments make up 0 to 30 percent of the soil. The soil in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 3. It is sandy loam in the fine-earth fraction.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 4 through 8. It is sandy loam in the fine-earth fraction.

The B horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 through 8. It is sandy loam in the fine-earth fraction.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. It is loamy sand or sand in the fine-earth fraction.

Lehew Series

The soils of the Lehew series are moderately deep and well drained. They formed in material weathered from sandstone bedrock. They are in areas characterized by high mountains and steep side slopes. Slopes range from 35 to 65 percent.

Lehew soils commonly are near Berks, Gilpin, and Wallen soils. The Lehew soils are redder throughout the profile than the Berks, Gilpin, or Wallen soils. The Berks and Gilpin soils formed in material weathered from shale.

Typical pedon of Lehew gravelly sandy loam, in an area of Lehew and Wallen soils, very stony, 35 to 65 percent slopes, on the north side of Clover Hollow Mountain, 200 yards from the top:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam; moderate fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; 20 percent gravel and channers; very strongly acid; abrupt smooth boundary.

Bw1—3 to 12 inches; yellowish red (5YR 4/6) gravelly loam; moderate fine granular structure; friable, nonsticky, nonplastic; many fine and medium roots; 20 percent gravel; very strongly acid; clear smooth boundary.

Bw2—12 to 18 inches; reddish brown (5YR 4/4) gravelly loam; moderate fine subangular blocky structure; friable, slightly sticky, nonplastic; common fine and medium roots; 20 percent gravel and channers; very strongly acid; clear wavy boundary.

Bw3—18 to 29 inches; reddish brown (2.5YR 4/4) very gravelly loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; 35 percent gravel and channers; very strongly acid; clear wavy boundary.

C—29 to 37 inches; reddish brown (2.5YR 4/4) extremely channery sandy loam; massive; friable, slightly sticky, nonplastic; 60 percent channers; very strongly acid; abrupt smooth boundary.

R—37 inches; hard sandstone bedrock.

The solum thickness ranges from 15 to 30 inches. The depth to bedrock ranges from 20 to 40 inches. Rock fragments of sandstone make up 0 to 40 percent of the A horizon, 20 to 60 percent of the B horizon, and 35 to 80 percent of the C horizon. The soil is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 1 through 4. It is sandy loam or loam in the fine-earth fraction.

The B horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 or 6. It is loam or sandy loam in the fine-earth fraction.

The C horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 3 or 4. It is loam or sandy loam in the fine-earth fraction.

The Lehew soils in this survey area are a taxadjunct to the Lehew series because they have siliceous mineralogy. This difference does not significantly affect the use and management of the soils.

Lily Series

The soils of the Lily series are moderately deep and well drained. They formed in residuum weathered from sandstone, siltstone, and interbedded shale. The soils are on rounded hills, ridge sides, and ridgetops. Slopes range from 0 to 65 percent.

Lily soils commonly are near Bailegap and Jefferson soils but are not as red in the subsoil as the Bailegap soils and are not as deep to bedrock as the Bailegap or Jefferson soils.

Typical pedon of Lily gravelly sandy loam, in an area of Lily-Bailegap complex, extremely stony, 15 to 35 percent slopes, on Flat Top Mountain, about 1/2 mile west of the intersection of VA Route 665 and VA Route 663:

A—0 to 1 inch; very dark grayish brown (10YR 3/2) gravelly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; many fine vesicular pores; 30 percent sandstone fragments; very strongly acid; abrupt irregular boundary.

E—1 to 7 inches; dark brown (10YR 4/3) gravelly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; common fine vesicular pores; 20 percent sandstone fragments; very strongly acid; clear irregular boundary.

EB—7 to 10 inches; 60 percent E material that is dark brown (10YR 4/3) gravelly loam; weak fine granular structure; very friable, nonsticky, nonplastic; 40 percent B material that is strong brown (7.5YR 5/6) clay loam; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy clay films; many fine and medium roots; few fine vesicular pores; 15 percent sandstone fragments; very strongly acid; clear wavy boundary.

Bt1—10 to 20 inches; strong brown (7.5YR 5/6) sandy clay loam; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine and medium roots; few fine vesicular pores; 10 percent sandstone fragments; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt2—20 to 30 inches; strong brown (7.5YR 5/8) gravelly loam; few fine faint light brown (7.5YR 6/4) mottles; weak fine and medium subangular blocky structure; firm, slightly sticky, slighty plastic; few fine and medium roots; few fine vesicular pores; 30 percent sandstone fragments; thin patchy clay films; very strongly acid; clear wavy boundary.

Bt3—30 to 36 inches; strong brown (7.5YR 5/8) clay loam; few fine faint light brown (7.5YR 6/4) mottles; weak medium angular blocky structure; very firm, sticky, plastic; few medium roots, few fine vesicular pores; 10 percent, sandstone fragments; thin patchy clay films; very strongly acid.

R—36 inches; fractured sandstone bedrock.

The solum thickness and depth to sandstone bedrock range from 20 to 40 inches. The content of rock fragments of sandstone ranges from 0 to 30 percent throughout the soil. The soil in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. It is loam or sandy loam in the fine-earth fraction.

The E horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or sandy loam in the fine-earth fraction.

The B horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. In the fine-earth fraction it is loam, sandy clay loam, or clay loam.

Nolichucky Series

The soils of the Nolichucky series are very deep and well drained. They formed in colluvial material derived mainly from sandstone and shale and minor amounts of limestone. The soils are in areas characterized by long steep and very steep mountain side slopes and gently sloping to moderately steep benches and foot slopes. Slopes range from 2 to 65 percent.

Nolichucky soils commonly are near Frederick, Gilpin, and Lily soils. The Nolichucky soils contain less clay than the Frederick soils and are deeper to bedrock and have a redder subsoil than the Gilpin or Lily soils.

Typical pedon of Nolichucky gravelly sandy loam, in an area of Nolichucky very stony sandy loam, 15 to 30 percent slopes, 0.2 mile east of First Ford on VA Route 61 west of Narrows, 0.3 mile north of VA Route 61, and 0.1 mile east of Buckhorn Branch:

A—0 to 2 inches; brown (10YR 4/3) gravelly sandy loam; weak fine granular structure; very friable, slightly sticky, nonplastic; many roots and pores; 30 percent sandstone gravel; strongly acid; clear smooth boundary.

E—2 to 8 inches; yellowish brown (10YR 5/4) gravelly sandy loam; moderate fine granular structure; very friable, slightly sticky, nonplastic; many roots and pores; 15 percent sandstone gravel; strongly acid; clear wavy boundary.

Bt1—8 to 15 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic, common roots; many pores; 5 percent sandstone gravel and 5 percent sandstone channers; thin patchy clay films; strongly acid; clear smooth boundary.

Bt2—15 to 24 inches; strong brown (7.5YR 5/6) clay loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; few roots; common pores; 5 percent sandstone channers; thin patchy clay films; strongly acid; clear smooth boundary.

Bt3—24 to 32 inches; strong brown (7.5YR 5/6) clay loam; many medium prominent red (2.5YR 4/6) mottles; strong medium subangular blocky structure; firm, slightly hard, slightly sticky, slightly plastic; few roots; common pores; 5 percent sandstone gravel and 5 percent sandstone channers; thin continuous clay films; common pressure faces; strongly acid; gradual smooth boundary.

2Bt4—32 to 43 inches; red (2.5YR 4/6) gravelly clay loam; common medium distinct yellowish red (5YR 5/8) mottles; strong medium subangular blocky structure; firm, slightly hard, slightly sticky, slightly plastic; few roots; common pores; 15 percent sandstone gravel and 5 percent sandstone channers; thin continuous clay films; common pressure faces; very strongly acid; gradual smooth boundary.

2Bt5—43 to 56 inches; red (2.5YR 5/8) clay loam; few medium distinct yellowish red (5YR 5/8) mottles; strong fine subangular blocky structure; friable, sticky, slightly plastic; few roots; common pores; 5 percent sandstone channers; thin continuous clay films; very strongly acid; gradual smooth boundary.

2Bt6—56 to 70 inches; yellowish red (5YR 5/8) clay loam; common medium distinct red (2.5YR 4/8) mottles and few medium prominent yellowish brown (10YR 5/6) mottles; strong fine subangular blocky structure; friable, sticky, slightly plastic; few roots; common pores; 10 percent sandstone channers; thin continuous clay films; very strongly acid.

The solum thickness and depth to bedrock are more than 60 inches. The content of rock fragments in the solum ranges from 0 to 30 percent. The soil in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 2 through 8. It is sandy loam or loam in the fine-earth fraction.

The E horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is sandy loam or loam in the fine-earth fraction.

The B horizon has hue mainly of 7.5YR, 5YR, or 2.5YR; value of 4 or 5; and chroma of 6 or 8. Some pedons have a BE horizon. In some areas the Bt1 and BE horizon have hue of 10YR. The B horizon mainly is clay loam or clay in the fine-earth fraction. In some areas the Bt1 and BE horizon are sandy clay loam in the fine-earth fraction.

Nolichucky soils in this survey area are a taxadjunct to the Nolichucky series because they have a yellower hue in the upper part of the argillic horizon than is defined for the range in the series. This difference does not significantly affect the use and management of the soils.

Poplimento Series

The soils of the Poplimento series are very deep and well drained. They formed in the weathered products of shale or shale and limestone. The soils are on uplands. Slopes range from 7 to 35 percent.

Poplimento soils commonly are near Carbo, Frederick, Gilpin, Nolichucky, and Sequoia soils. The Poplimento soils are deeper to bedrock than the Carbo, Gilpin or Sequoia soils, have a more clayey subsoil than the Gilpin or Nolichucky soils, and have a thinner solum than the Frederick soils or the Nolichucky soils.

Typical pedon of Poplimento silt loam, 15 to 25 percent slopes, about 1.5 miles west of Pembroke on VA Route 626:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable, slightly sticky, nonplastic; many fine roots; 2 percent shale fragments; neutral; clear wavy boundary.

Bt1—7 to 19 inches; yellowish brown (10YR 5/8) silty clay loam; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; 5 percent shale fragments; common manganese oxide nodules; thin continuous clay films; neutral; clear wavy boundary.

Bt2—19 to 29 inches; reddish yellow (7.5YR 6/8) clay; moderate fine and medium subangular blocky structure; firm, sticky, slightly plastic; few fine roots; 10 percent shale fragments; common manganese oxide nodules; thin continuous clay films; strongly acid; clear wavy boundary.

Bt3—29 to 42 inches; brownish yellow (10YR 6/8) shaly clay; moderate fine and medium subangular blocky structure; firm, sticky, slightly plastic; 25 percent shale fragments; common manganese oxide nodules; thin continuous clay films; strongly acid; gradual wavy boundary.

BC—42 to 55 inches; brownish yellow (10YR 6/8) very shaly clay; common medium prominent yellow (10YR 7/6) mottles; weak coarse subangular blocky structure; firm, sticky, slightly plastic; 45 percent shale fragments; common manganese oxide coatings on shale fragments and peds; strongly acid; clear wavy boundary.

C—55 to 72 inches; brownish yellow (10YR 6/8) very shaly clay; common medium prominent yellow (10YR 7/6) mottles; massive; firm, sticky, slightly plastic; 45 percent highly weathered shale fragments; common oxide coatings on shale fragments and peds; strongly acid.

The solum thickness ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. Rock fragments of chert and shale make up 0 to 15 percent of the upper part of solum and 10 to 50 percent of the lower part of the solum and of the substratum. The soil in unlimed areas ranges from very strongly acid through moderately acid in the upper part of the solum and from strongly acid through slightly acid in the lower part of the solum.

The Ap horizon has hue of 10YR, value mainly of 4 or 5, and chroma mainly of 3 or 4. Some pedons have an A horizon with value of 3 through 5 and chroma of 2 through 4. The A and Ap horizons are loam or silt loam.

Some pedons have an E horizon that has hue of 10YR, value of 6, and chroma of 4 or 6. It is loam or silt loam.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8. In some pedons the lower part of the B horizon has yellow, brown, or red mottles. The B horizon mainly is silty clay loam, silty clay, or clay, but the lower part consists of other textures.

The BC horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. It is silty clay or clay in the fine-earth fraction.

The C horizon is mottled yellow and brown. In the fine-earth fraction it is silty clay loam, silty clay, or clay.

Sequoia Series

The soils of the Sequoia series are moderately deep and well drained. They formed in material weathered from shale or from interbedded shale and limestone. The soils are in areas characterized by smooth, rounded hills and ridges with broad, sloping tops and moderately steep or steep side slopes. Slopes range from 10 to 65 percent.

Sequoia soils commonly are near Berks and Gilpin soils but contain more clay and are redder than those soils.

Typical pedon of Sequoia silt loam, 10 to 30 percent slopes, 1 mile on VA Route 601 from the intersection of VA Route 601 and VA Route 42, 400 yards northeast of a covered bridge and 100 yards southeast of a small cemetary:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine granular structure; friable, slightly sticky, nonplastic; common roots; neutral; abrupt smooth boundary.

Bt1—7 to 13 inches; yellowish red (5YR 5/8) silty clay loam; common roots and worm channels of dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; common roots; 5 percent weathered shale fragments; thin discontinuous clay films; neutral; clear irregular boundary.

Bt2—13 to 32 inches; yellowish red (5YR 5/8) silty clay; moderate medium and coarse subangular blocky structure; firm, sticky, plastic; common roots; 15 percent shale fragments; thick continuous clay films; strongly acid; clear irregular boundary.

C1—32 to 55 inches; light olive brown (2.5Y 5/4) weathered shale that crushes to silt loam; common pockets and seams of yellowish red (5YR 5/8) silty clay; massive; firm, slightly sticky, slightly plastic; few roots; very strongly acid; gradual wavy boundary.

C2—55 to 73 inches; light olive brown (2.5Y 5/4) weathered shale that crushes to silt loam; massive; very firm, slightly sticky, nonplastic; very strongly acid.

R—73 inches; hard shale.

The solum thickness and depth to soft shale range from 20 to 40 inches. The depth to hard shale is commonly more than 5 feet. The content of shale fragments ranges from 0 to 15 percent in the solum and 10 to 90 percent in the substratum. The soil in unlimed areas is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4.

The Bt horizon has a hue of 5YR, value of 5, and chroma of 6 or 8. It is silty clay loam or silty clay.

The C horizon is yellow and olive shale. It crushes to silt loam and between shale layers is silty clay loam or silty clay.

The Sequoia soils in this survey area are a taxadjunct to the Sequoia series because the substratum is highly weathered shale and is a C horizon. These differences do not significantly affect the use and management of the soils.

Timberville Variant

The soils of the Timberville Variant are very deep and well drained. They formed in material washed dominantly from areas of limestone and some shale and sandstone. The soils are along drainageways in depressions. Slopes range from 2 to 15 percent.

Timberville Variant soils commonly are near Carbo and Frederick soils but do not contain as much clay as those soils.

Typical pedon of Timberville Variant loam, 2 to 7 percent slopes, about 1 mile south of Eggleston on VA Route 730, 100 yards northwest of VA Route 730:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) loam; moderate fine granular structure; friable, slightly sticky, nonplastic; many fine roots; 2 percent semirounded chert fragments; neutral; abrupt smooth boundary.

Bw—8 to 17 inches; strong brown (7.5YR 5/6) loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, nonplastic; few fine roots; few dark oxide ped coatings; 2 percent semirounded chert fragments; neutral; clear wavy boundary.

Bt1—17 to 27 inches; strong brown (7.5YR 5/6) clay loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; common dark oxide ped coatings and nodules; thin patchy strong brown (7.5YR 5/8) ped coatings; 2 percent semirounded chert fragments; neutral; clear wavy boundary.

Bt2—27 to 39 inches; strong brown (7.5YR 5/6) clay loam; moderate fine and medium subangular blocky structure; firm, slightly brittle, slightly sticky, slightly plastic; few fine roots; many dark oxide ped coatings and nodules; thin patchy strong brown (7.5YR 5/8) ped coatings; chert fragments; moderately acid; abrupt wavy boundary.

2Bt3—39 to 70 inches; strong brown (7.5YR 5/6) cherty clay loam; moderate fine and medium subangular blocky structure; firm, slightly brittle, slightly sticky, slightly plastic; no roots; many dark oxide ped coatings and nodules; few medium prominent very pale brown (10YR 7/3) mottles; 30 percent chert fragments and 5 percent rounded sandstone cobbles; thin patchy strong brown (7.5YR 5/8) ped coatings; strongly acid.

The solum thickness is more than 60 inches. The depth to bedrock is more than 60 inches. Some pedons have a lithologic discontinuity. The content of rock fragments ranges from 0 to 10 percent above the lithologic discontinuity and 10 to 35 percent below. The soil is slightly acid or neutral in the surface layer, moderately acid through neutral in the upper part of the subsoil, and strongly acid through slightly acid in the lower part of the subsoil.

The A horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is loam or silt loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 5 or 6. It mainly is silt loam, loam, or clay loam. In some areas below the lithologic discontinuity, it is clay or silty clay loam.

Wallen Series

The soils of the Wallen series are moderately deep and somewhat excessively drained. They formed in residual material weathered from sandstone bedrock. The soils are in areas characterized by high mountains and steep side slopes. Slopes range from 35 to 65 percent.

Wallen soils commonly are near Berks, Gilpin, and Lehew soils and are mapped only with Lehew soils. The Wallen soils do not have the red that is typical of the Lehew soils. The Berks and Gilpin soils formed in material weathered from shale.

Typical pedon of Wallen channery sandy loam, in an area of Lehew and Wallen soils, very stony, 35 to 65 percent slopes, 3/4 mile south-southeast of the intersection of VA Routes 606 and 605, 2 miles southeast of Oakview Church, 1.5 miles south-southwest of Newport Cemetary:

A—0 to 2 inches; very dark gray (10YR 3/1) channery sandy loam; weak fine granular structure; very friable; many fine and medium roots; many fine pores; 20 percent sandstone channers; moderately acid; abrupt smooth boundary.

E—2 to 8 inches; yellowish brown (10YR 5/6) channery sandy loam; weak fine granular structure; very friable; many fine and medium roots; many fine pores; 30 percent sandstone channers; moderately acid; clear smooth boundary.

BE—8 to 16 inches; light yellowish brown (10YR 6/4) very channery sandy loam; weak fine subangular blocky structure; very friable; common fine and medium roots; common fine pores; 45 percent sandstone channers; strongly acid; clear smooth boundary.

Bw—16 to 22 inches; reddish yellow (7.5YR 6/6) very channery sandy loam; common fine faint light yellowish brown (10YR 6/4) mottles; moderate fine subangular blocky structure; friable; few fine roots; common fine pores; 50 percent sandstone channers; very strongly acid; clear smooth boundary.

C—22 to 31 inches; strong brown (7.5YR 5/8) extremely channery sandy loam; common fine faint light yellowish brown (10YR 6/4) mottles; massive; friable; 70 percent sandstone channers; very strongly acid.

R—31 inches; very pale brown to yellowish brown fractured sandstone.

The thickness of solum and the depth to bedrock range from 20 to 40 inches. Channery sandstone fragments make up 15 to 35 percent of the A and E horizons and 35 to 70 percent of the B and C horizons. The soil in unlimed areas ranges from very strongly acid through moderately acid.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 1 through 6. It is sandy loam in the fine-earth fraction.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 5 or 6. It is sandy loam in the fine-earth fraction.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 6. It is sandy loam in the fine-earth fraction.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 through 8. It is sandy loam in the fine-earth fraction.

Formation of the Soils

Soil is formed by weathering and other processes that act upon parent material. The characteristics of the soil at any given point depend upon interaction of parent material, climate, plants and animals, relief, and time.

Climate and plants and animals are the active forces of soil formation. They act on the parent material accumulated through the weathering of rocks and slowly change it into soil. Although all five factors affect the formation of every soil, the relative importance of each differs from place to place. In extreme cases one factor may dominate in the formation of a soil and fix most of its properties. In general, however, it is the combined action of the five factors that determines the character of each soil.

Parent Material

The unconsolidated mass from which a soil formed is parent material. It is largely responsible for the chemical and mineralogical composition of the soil and the rate at which soil-forming processes take place. Parent materials in Giles County are of three kinds: residual, alluvial, and colluvial.

Some of the residual parent materials are limestone, shale, siltstone, and sandstone. Soils formed in residuum from limestone, dolomite, and shale are most extensive on uplands of the Appalachian Valley and have a wide range of characteristics. Limestone-derived soils typically have a silty surface layer and a clayey subsoil. Examples are the Frederick and Poplimento soils. Residuum from acid shale and siltstone is the parent material of Berks and Gilpin soils. The coarse-textured acid sandstone residuum weathered to form the Lehew soils.

Alluvial parent materials are of local origin along the smaller streams and of local and general origin along the New River. Soils derived from alluvium have a wide range in texture and development. Examples of such soils are Allegheny, Chagrin, Chagrin Variant, Chavies Variant, and Cotaco soils and Fluvaquents.

Colluvial parent materials dominantly are along lower mountain slopes, and they are primarily moderately coarse textured, medium textured, or moderately fine textured. Examples are Jefferson and Nolichucky soils.

Climate

As a genetic factor, climate affects the physical, chemical, and biological relationships in soils, principally through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the surface layer and subsoil. Temperature determines the types of physical, chemical, and biological activities that take place and the speed at which they act.

Because the precipitation in the county accumulates at a rate that exceeds evapotranspiration, the soils have been leached. Much of the soluble materials that originally were present or were released through weathering have been removed. Exceptions to this are alluvial areas which are recharged with carbonates by limestone springs and areas of soils that are shallow to dolomitic rock. In addition to leaching soluble materials, water that percolates through the soil moves clay from the surface layer to the subsoil. Except for soils formed in recent alluvium or sand or on very steep slopes, the soils of the county typically contain more clay in the subsoil than in the surface layer.

Also influenced by climate is the formation of blocky structure in the subsoil of well developed soils. The development of peds (aggregates) in the subsoil is caused partly by changes in volume of the soil mass that are primarily the result of alternate wetting and drying.

Plant and Animal Life

Micro-organisms, vegetation, animals, and man are factors of soil formation. Vegetation is generally responsible for the amount of organic matter in the soil and the color of the surface layer. Earthworms, cicada, and burrowing animals help keep the soil open and porous. Micro-organisms decompose the vegetation and dead animal matter, thus releasing nutrients for plant food.

Before settlement by man, native vegetation was the major living organism affecting soil development. The native vegetation consisted mainly of hardwoods. Oaks, hickories, and chestnuts were the dominant trees in the original forest cover, and hemlock and eastern white pine were the most abundant conifers in the cooler areas. Most hardwoods use a large amount of the available calcium and other bases and constantly recycle them through leaf fall and decay. Coniferous trees recycle a smaller amount of bases than deciduous trees; consequently, more bases have been leached from soils developed under coniferous vegetation than under deciduous vegetation. The soils of the mountainous regions of the county that are underlain by acid parent rock have few remaining bases, even though they developed under a hardwood forest. This is mainly because of the low base content of the original parent material.

The clearing of the forest, cultivation, the introduction of new plants, and changes in natural drainage all have their effect on soil development. The most important changes brought about by man, however, are the mixing of the upper layers of the soil to form a plow layer, the cultivating of strongly sloping soils, resulting in accelerated erosion, and liming and fertilizing to change the content of plant nutrients, especially in the upper layers.

Relief

The underlying geologic formations, the geologic history of the general region, and the effects of dissection by rivers and streams largely determine the relief of an area. Relief influences soil formation through its effects on moisture relationships, erosion, temperature, and plant cover.

Giles County has numerous mountains, and the highest elevation above sea level is 4,348 feet on Bald Knob. The mountains are underlain by resistant rocks such as sandstone. In the valleys, the Martinsburg shale formation consistently forms areas that have the least relief. The more hilly valley areas characteristically are underlain by other rocks, especially Beekmantown dolomite, which generally contains massive chert beds.

Most upland areas are well drained. Soils on the terraces and flood plains range from well drained to poorly drained. Drainage commonly is related to the texture and position of the parent material. Thus, fine-textured slackwater deposits in low positions commonly are poorly drained and deep deposits of coarser textured materials are well drained.

Time

As a factor of soil formation, time generally is related to the degree of development or degree of horizon differentiation within the soil. A soil that has little or no horizon development is considered a young soil, and one that has strongly developed horizons is considered an old, or mature, soil.

The oldest soils in Giles County are those formed in residual material weathered from bedrock. In general, these soils are in less sloping, relatively stable positions and formed in easily weatherable materials. These older soils have a strong degree of horizon differentiation. On very steep slopes, geologic erosion removed soil material in a relatively short period and the soils generally have not been in place long enough to develop more than a moderate horizon differentiation. Soils formed in recent alluvium have been in place only a relatively short time and show little or no development other than an accumulation of organic matter in the surface layer. They commonly are stratified and have an irregular distribution of organic matter.

Processes of Horizon Development

The main processes of horizon development are the accumulation of organic matter, the leaching of soluble soils, the chemical reduction and movement of iron, the formation of soil structure, and the translocation and loss of clay minerals, aluminum, and silica. These processes constantly take place, and most usually occur at the same time throughout the profile.

Organic matter accumulates as plant and animal residue is deposited and then decomposed. This process darkens the surface layer and aids in forming the A horizon. Organic matter accumulates very slowly, and if lost it takes a long time to replace.

It is thought that some lime and other soluble salts are leached prior to the translocation of iron and clay. Leaching is affected by factors such as the kinds of salts originally present, the percolation depth of the soil solution, and the soil texture. Once leaching has occurred, clay is more easily dispersed and allowed to enter the soil solution. Many of the soils in the county have a Bt horizon in which clay has accumulated. This accumulation is believed to occur as the soil solution carries dispersed clay down through the profile and then deposits it as the solution dries. The E horizon loses much of its clay to the translocation process and contains mostly inert materials such as silt and sand-size quartz. Many soils in the county contain more clay in the subsoil than in the surface horizon.

Well drained and moderately well drained soils in Giles County generally have a red to yellowish brown subsoil. These colors are largely a result of iron oxide coatings, but in some soils the color is inherited from the materials from which the soil developed. Weak to medium development of subangular blocky structure has occurred in most soils.

The reduction and transfer of iron is mainly associated with the wetter, more poorly drained soils and is known as gleying. Poorly drained soils have a subsoil and underlying material that are grayish, which indicates reduction and transfer of iron. Moderately well drained to somewhat poorly drained soils have yellowish brown to gray mottles caused by the segregation of iron.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Conservation tillage. A system of noninversion tillage that retains protective amounts of residue mulch on the surface throughout the year by use of no-tillage, strip tillage, and stubble mulching.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity*, or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from

4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1952-78 at Blacksburg, Virginia]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days[1]	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	40.8	20.1	30.5	66	-6	48	2.86	1.79	3.82	7	6.9
February---	44.0	22.1	33.1	68	0	57	2.97	1.42	4.30	7	5.4
March------	52.7	29.4	41.1	79	10	163	3.84	2.42	5.11	9	5.0
April------	64.0	38.6	51.3	83	20	345	3.46	2.20	4.60	8	.6
May--------	72.3	47.6	60.0	87	27	620	3.74	2.15	5.15	9	.0
June-------	78.8	54.8	66.8	91	37	804	3.55	1.80	5.07	9	.0
July-------	82.7	59.3	71.0	93	44	961	3.53	2.35	4.60	8	.0
August-----	81.5	58.4	70.0	92	43	930	3.67	2.30	4.89	7	.0
September--	75.9	51.4	63.7	90	31	711	3.50	1.62	5.10	7	.0
October----	65.5	39.4	52.5	82	19	388	3.23	1.24	4.89	6	.1
November---	54.6	30.7	42.7	75	9	128	2.63	1.41	3.70	7	1.8
December---	43.7	23.3	33.5	67	0	51	3.02	1.50	4.36	8	3.7
Yearly:											
Average--	63.0	39.6	51.4	---	---	---	---	---	---	---	---
Extreme--	---	---	---	94	-6	---	---	---	---	---	---
Total----	---	---	---	---	---	5,206	40.01	34.17	45.67	92	23.5

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1952-78 at Blacksburg, Virginia]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 23	May 15	May 23
2 years in 10 later than--	April 17	May 8	May 16
5 years in 10 later than--	April 5	April 24	May 4
First freezing temperature in fall:			
1 year in 10 earlier than--	October 11	October 2	September 22
2 years in 10 earlier than--	October 17	October 7	September 27
5 years in 10 earlier than--	October 28	October 16	October 6

TABLE 3.--GROWING SEASON

[Data recorded in the period 1952-78 at Blacksburg, Virginia]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	175	148	129
8 years in 10	185	157	138
5 years in 10	205	175	155
2 years in 10	224	195	171
1 year in 10	234	201	180

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1B	Allegheny loam, 2 to 7 percent slopes	1,908	1.1
1C	Allegheny loam, 7 to 15 percent slopes	371	0.2
2D	Berks shaly silt loam, 10 to 30 percent slopes	451	0.3
2F	Berks shaly silt loam, 30 to 65 percent slopes	2,146	1.2
3F	Berks very stony silt loam, 30 to 65 percent slopes	830	0.5
4B	Braddock sandy loam, 2 to 7 percent slopes	1,277	0.7
4C	Braddock sandy loam, 7 to 15 percent slopes	2,462	1.4
4D	Braddock sandy loam, 15 to 25 percent slopes	1,611	0.9
4E	Braddock sandy loam, 25 to 35 percent slopes	1,019	0.6
5C	Carbo silty clay loam, very rocky, 2 to 15 percent slopes	559	0.3
5D	Carbo silty clay loam, very rocky, 15 to 45 percent slopes	3,950	2.3
6F	Carbo-Rock outcrop complex, 25 to 65 percent slopes	6,359	3.8
7	Chagrin silt loam	832	0.5
8	Chagrin Variant loamy sand	561	0.3
9	Chavies Variant sandy loam	2,494	1.5
10B	Cotaco loam, 2 to 7 percent slopes	595	0.3
10C	Cotaco loam, 7 to 15 percent slopes	374	0.2
11D	Faywood silt loam, 10 to 30 percent slopes	379	0.2
11F	Faywood silt loam, 30 to 65 percent slopes	1,238	0.7
12	Fluvaquents, nearly level	1,442	0.8
13B	Frederick silt loam, 2 to 7 percent slopes	283	0.2
13C	Frederick silt loam, 7 to 15 percent slopes	2,225	1.3
13D	Frederick silt loam, 15 to 25 percent slopes	2,422	1.4
13E	Frederick silt loam, 25 to 35 percent slopes	2,830	1.7
14B	Frederick cherty silt loam, 2 to 7 percent slopes	361	0.2
14C	Frederick cherty silt loam, 7 to 15 percent slopes	5,794	3.4
14D	Frederick cherty silt loam, 15 to 25 percent slopes	7,674	4.5
14E	Frederick cherty silt loam, 25 to 35 percent slopes	15,083	8.9
15C	Frederick very stony silt loam, 7 to 15 percent slopes	705	0.4
15D	Frederick very stony silt loam, 15 to 25 percent slopes	2,002	1.2
15E	Frederick very stony silt loam, 25 to 35 percent slopes	4,083	2.4
16D	Frederick-Rock outcrop complex, 10 to 30 percent slopes	1,619	0.9
16F	Frederick-Rock outcrop complex, 30 to 60 percent slopes	4,648	2.7
17C	Gilpin silt loam, 7 to 15 percent slopes	508	0.3
17D	Gilpin silt loam, 15 to 30 percent slopes	912	0.5
17F	Gilpin silt loam, 30 to 65 percent slopes	2,129	1.2
18D	Gilpin very stony silt loam, 10 to 30 percent slopes	1,081	0.6
18F	Gilpin very stony silt loam, 30 to 65 percent slopes	3,488	2.0
19C	Jefferson loam, 0 to 15 percent slopes	131	*
20C	Jefferson very stony loam, 0 to 15 percent slopes	332	0.2
20E	Jefferson very stony loam, 15 to 35 percent slopes	776	0.5
21C	Jefferson extremely stony loam, 0 to 15 percent slopes	219	0.1
*21E	Jefferson extremely stony loam, 15 to 35 percent slopes	195	0.1
21F	Jefferson extremely stony loam, 35 to 65 percent slopes	332	0.2
22D	Jefferson Variant and Drall soils, very stony, 10 to 30 percent slopes	964	0.6
22F	Jefferson Variant and Drall soils, very stony, 30 to 65 percent slopes	5,570	3.3
23F	Lehew and Wallen soils, very stony, 35 to 65 percent slopes	5,735	3.4
24C	Lily gravelly sandy loam, 0 to 15 percent slopes	539	0.3
24D	Lily gravelly sandy loam, 15 to 35 percent slopes	202	0.1
25F	Lily extremely stony sandy loam, 35 to 65 percent slopes	214	0.1
26F	Lily gravelly sandy loam, very rocky, 35 to 65 percent slopes	54	*
27C	Lily-Bailegap complex, very stony, 2 to 15 percent slopes	1,037	0.6
27E	Lily-Bailegap complex, very stony, 15 to 35 percent slopes	1,922	1.1
27F	Lily-Bailegap complex, very stony, 35 to 65 percent slopes	5,771	3.5
28E	Lily-Bailegap complex, extremely stony, 15 to 35 percent slopes	1,359	0.8
29B	Nolichucky loam, 2 to 7 percent slopes	772	0.5
29C	Nolichucky loam, 7 to 15 percent slopes	1,837	1.1
29D	Nolichucky loam, 15 to 25 percent slopes	878	0.5
30C	Nolichucky very stony sandy loam, 7 to 15 percent slopes	5,794	3.4
30D	Nolichucky very stony sandy loam, 15 to 30 percent slopes	11,577	6.8
30F	Nolichucky very stony sandy loam, 30 to 65 percent slopes	29,016	17.1
31C	Poplimento silt loam, 7 to 15 percent slopes	316	0.2
31D	Poplimento silt loam, 15 to 25 percent slopes	395	0.2
31E	Poplimento silt loam, 25 to 35 percent slopes	854	0.5
32F	Rock outcrop-Berks complex, 30 to 80 percent slopes	773	0.5

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
33D	Sequoia silt loam, 10 to 30 percent slopes	331	0.2
33F	Sequoia silt loam, 30 to 65 percent slopes	671	0.4
34	Slickens, nearly level	30	*
35B	Timberville Variant loam, 2 to 7 percent slopes	1,171	0.7
35C	Timberville Variant loam, 7 to 15 percent slopes	262	0.2
	Water	2,079	1.2
	Total	170,813	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland]

Map symbol	Soil name
1B	Allegheny loam, 2 to 7 percent slopes
4B	Braddock sandy loam, 2 to 7 percent slopes
7	Chagrin silt loam
9	Chavies Variant sandy loam
10B	Cotaco loam, 2 to 7 percent slopes
13B	Frederick silt loam, 2 to 7 percent slopes
14B	Frederick cherty silt loam, 2 to 7 percent slopes
29B	Nolichucky loam, 2 to 7 percent slopes
35B	Timberville Variant loam, 2 to 7 percent slopes

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Alfalfa hay	Kentucky bluegrass	Grass-legume hay	Tall fescue pasture
	Bu	Ton	Ton	AUM*	Ton	AUM*
1B------------------------ Allegheny	125	25	5.0	7.5	3.5	8.0
1C------------------------ Allegheny	115	23	4.5	7.5	3.5	8.0
2D------------------------ Berks	70	14	3.0	5.0	2.5	5.5
2F, 3F-------------------- Berks	---	---	---	---	---	---
4B------------------------ Braddock	130	26	5.0	7.5	4.0	9.0
4C------------------------ Braddock	125	25	4.5	7.0	4.0	8.5
4D------------------------ Braddock	110	22	4.0	6.5	3.5	8.0
4E------------------------ Braddock	---	---	---	---	---	---
5C------------------------ Carbo	80	17	3.5	5.0	3.0	7.0
5D------------------------ Carbo	---	---	3.0	4.5	2.5	6.5
6F------------------------ Carbo-Rock outcrop	---	---	---	---	---	---
7------------------------- Chagrin	120	24	5.0	7.5	4.0	8.5
8------------------------- Chagrin Variant	130	26	4.5	7.5	4.0	8.5
9------------------------- Chavies Variant	120	24	5.0	7.5	4.0	8.0
10B----------------------- Cotaco	115	23	---	6.0	3.5	7.0
10C----------------------- Cotaco	110	22	---	5.5	3.0	6.5
11D----------------------- Faywood	---	---	4.0	5.0	3.0	6.0
11F----------------------- Faywood	---	---	---	3.5	---	---
12**. Fluvaquents						
13B----------------------- Frederick	130	26	5.0	7.5	4.0	8.5
13C----------------------- Frederick	120	24	4.5	7.0	3.5	8.0

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Alfalfa hay	Kentucky bluegrass	Grass-legume hay	Tall fescue pasture
	Bu	Ton	Ton	AUM*	Ton	AUM*
13D----------------------- Frederick	110	22	4.0	6.5	3.0	7.7
13E----------------------- Frederick	---	---	---	---	---	---
14B----------------------- Frederick	115	23	5.0	7.5	4.0	8.5
14C----------------------- Frederick	110	22	4.5	7.0	3.5	8.0
14D----------------------- Frederick	95	19	4.0	6.5	3.0	7.7
14E----------------------- Frederick	---	---	---	---	---	---
15C----------------------- Frederick	---	---	---	---	---	---
15D----------------------- Frederick	---	---	---	---	---	---
15E----------------------- Frederick	---	---	---	---	---	---
16D----------------------- Frederick-Rock outcrop	---	---	---	---	---	---
16F----------------------- Frederick-Rock outcrop	---	---	---	---	---	---
17C----------------------- Gilpin	85	17	3.0	5.0	2.5	6.5
17D----------------------- Gilpin	80	16	3.0	4.5	2.0	6.0
17F----------------------- Gilpin	---	---	---	---	---	---
18D----------------------- Gilpin	---	---	---	---	---	---
18F----------------------- Gilpin	---	---	---	---	---	---
19C----------------------- Jefferson	100	20	4.0	7.0	3.0	7.0
20C----------------------- Jefferson	---	---	---	---	---	---
20E----------------------- Jefferson	---	---	---	---	---	---
21C, 21E, 21F------------- Jefferson	---	---	---	---	---	---
22D----------------------- Jefferson Variant and Drall	---	---	---	---	---	---
22F----------------------- Jefferson Variant and Drall	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Alfalfa hay	Kentucky bluegrass	Grass-legume hay	Tall fescue pasture
	Bu	Ton	Ton	AUM*	Ton	AUM*
23F Lehew and Wallen	---	---	---	---	---	---
24C Lily	100	20	4.0	7.0	3.5	8.0
24D Lily	---	---	---	---	---	---
25F Lily	---	---	---	---	---	---
26F Lily	---	---	---	---	---	---
27C, 27E Lily-Bailegap	---	---	---	---	---	---
27F Lily-Bailegap	---	---	---	---	---	---
28E Lily-Bailegap	---	---	---	---	---	---
29B Nolichucky	105	21	5.0	7.5	4.0	8.0
29C Nolichucky	95	19	4.5	7.0	4.0	7.5
29D Nolichucky	85	17	4.0	6.5	3.5	6.5
30C, 30D Nolichucky	---	---	---	---	---	---
30F Nolichucky	---	---	---	---	---	---
31C Poplimento	120	24	4.5	7.0	3.5	8.0
31D Poplimento	110	22	4.0	6.5	3.0	7.7
31E Poplimento	---	---	---	---	---	---
32F** Rock outcrop-Berks	---	---	---	---	---	---
33D Sequoia	---	---	---	4.5	---	---
33F Sequoia	---	---	---	4.0	---	---
34**. Slickens						
35B. Timberville Variant	120	24	---	7.0	3.0	7.0
35C Timberville Variant	110	22	---	7.0	3.0	7.0

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* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
1B, 1C------------- Allegheny	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black walnut.
						Yellow-poplar-------	90	
						Virginia pine-------	76	
						Eastern white pine--	90	
						Shortleaf pine------	76	
2D----------------- Berks (North aspect)	3f	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	Virginia pine, eastern white pine.
						Black oak-----------	70	
						Virginia pine-------	70	
2D----------------- Berks (South aspect)	4f	Moderate	Moderate	Moderate	Moderate	Northern red oak----	60	Virginia pine, eastern white pine.
						Black oak-----------	60	
						Virginia pine-------	60	
2F----------------- Berks (North aspect)	3f	Severe	Severe	Moderate	Moderate	Northern red oak----	70	Virginia pine, eastern white pine.
						Black oak-----------	70	
						Virginia pine-------	70	
2F----------------- Berks (South aspect)	4f	Severe	Severe	Moderate	Moderate	Northern red oak----	60	Virginia pine, eastern white pine.
						Black oak-----------	60	
						Virginia pine-------	60	
3F----------------- Berks (North aspect)	3f	Severe	Severe	Moderate	Moderate	Northern red oak----	66	Virginia pine, eastern white pine.
						Black oak-----------	70	
						Virginia pine-------	66	
3F----------------- Berks (South aspect)	4f	Severe	Severe	Moderate	Moderate	Northern red oak----	60	Virginia pine, eastern white pine.
						Black oak-----------	60	
						Virginia pine-------	56	
4B, 4C------------- Braddock	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	
						Eastern white pine--	95	
						Virginia pine-------	76	
						Shortleaf pine------	76	
4D, 4E------------- Braddock (North aspect)	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Yellow-poplar, eastern white pine.
						Yellow-poplar-------	90	
						Eastern white pine--	95	
						Virginia pine-------	76	
						Shortleaf pine------	76	
4D, 4E------------- Braddock (South aspect)	3r	Moderate	Moderate	Slight	Slight	Northern red oak----	70	Yellow-poplar, eastern white pine.
						Yellow-poplar-------	80	
						Eastern white pine--	85	
						Virginia pine-------	76	
						Shortleaf pine------	76	
5C----------------- Carbo	3c	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	Eastern white pine, shortleaf pine, yellow-poplar.
						Yellow-poplar-------	80	
						Eastern white pine--	80	
5D----------------- Carbo	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	Eastern white pine, shortleaf pine, yellow-poplar.
						Yellow-poplar-------	80	
						Eastern white pine--	80	
6F*:								
Carbo-------------	3r	Severe	Severe	Moderate	Moderate	Northern red oak----	70	Eastern white pine, shortleaf pine, yellow-poplar.
						Yellow-poplar-------	80	
						Eastern white pine--	80	
Rock outcrop.								

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
7 Chagrin	1o	Slight	Slight	Slight	Slight	Northern red oak	86	Eastern white pine, black walnut, yellow-poplar.
						Yellow-poplar	96	
						Sugar maple	86	
						White oak	---	
						Black cherry	---	
						White ash	---	
						Black walnut	---	
8 Chagrin Variant	1o	Slight	Slight	Slight	Slight	Yellow-poplar	100	Yellow-poplar, eastern white pine.
						American sycamore	90	
						Northern red oak	---	
						Hickory	---	
9 Chavies Variant	2o	Slight	Slight	Slight	Slight	Black walnut	---	Eastern white pine, yellow-poplar, black walnut.
						American sycamore	---	
						Northern red oak	---	
						Yellow-poplar	---	
10B, 10C Cotaco	2o	Slight	Slight	Slight	Slight	Northern red oak	86	Eastern white pine, yellow-poplar, Virginia pine.
						Yellow-poplar	---	
						Virginia pine	---	
						Shortleaf pine	---	
						Black oak	---	
						Black walnut	---	
11D Faywood	3c	Moderate	Moderate	Slight	Slight	Northern red oak	70	Shortleaf pine, eastern white pine.
						Eastern white pine	80	
						Virginia pine	70	
11F Faywood	3c	Severe	Severe	Slight	Slight	Northern red oak	70	Shortleaf pine, eastern white pine.
						Eastern white pine	80	
						Virginia pine	70	
13B, 13C Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak	76	Eastern white pine, yellow-poplar, shortleaf pine.
						Yellow-poplar	86	
						Black locust	---	
						White oak	---	
13D, 13E Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak	76	Eastern white pine, yellow-poplar, shortleaf pine.
						Yellow-poplar	86	
						Black locust	---	
						White oak	---	
14B, 14C Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak	76	Eastern white pine, yellow-poplar, shortleaf pine.
						Yellow-poplar	86	
						Black locust	---	
14D, 14E Frederick	2r	Moderate	Moderate	Slight	Slight	Northern red oak	76	Eastern white pine, yellow-poplar.
						Yellow-poplar	86	
						Black locust	---	
15C Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak	76	Eastern white pine, yellow-poplar, shortleaf pine.
						Yellow-poplar	86	
						Black locust	---	
						White oak	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
15D, 15E----------- Frederick	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	76	Eastern white pine, yellow-poplar, shortleaf pine.
						Yellow-poplar-------	86	
						Black locust--------	---	
						White oak-----------	---	
16D*:								
Frederick---------	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	76	Eastern white pine, yellow-poplar, shortleaf pine.
						Yellow-poplar-------	86	
						Black locust--------	---	
						White oak-----------	---	
Rock outcrop.								
16F*:								
Frederick---------	3r	Severe	Severe	Slight	Slight	Northern red oak----	70	Eastern white pine, yellow-poplar, shortleaf pine.
						Yellow-poplar-------	85	
						Black locust--------	---	
						White oak-----------	---	
Rock outcrop.								
17C---------------- Gilpin	2x	Slight	Slight	Slight	Moderate	Northern red oak----	80	Virginia pine, eastern white pine, yellow-poplar.
						Yellow-poplar-------	95	
17D---------------- Gilpin (North aspect)	2r	Moderate	Moderate	Slight	Moderate	Northern red oak----	80	Virginia pine, eastern white pine, yellow-poplar.
						Yellow-poplar-------	95	
17D---------------- Gilpin (South aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	Virginia pine, eastern white pine, yellow-poplar.
						Yellow-poplar-------	80	
17F---------------- Gilpin (North aspect)	2r	Severe	Severe	Slight	Moderate	Northern red oak----	80	Virginia pine, eastern white pine, yellow-poplar.
						Yellow-poplar-------	95	
17F---------------- Gilpin (South aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak----	70	Virginia pine, eastern white pine.
						Yellow-poplar-------	80	
18D---------------- Gilpin (North aspect)	2r	Moderate	Moderate	Slight	Moderate	Northern red oak----	80	Virginia pine, eastern white pine, yellow-poplar.
						Yellow-poplar-------	95	
18D---------------- Gilpin (South aspect)	3r	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	Virginia pine, eastern white pine.
						Yellow-poplar-------	80	

See footnote at end of table.

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TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Common trees	Site index	
18F---------------- Gilpin (North aspect)	2r	Severe	Severe	Slight	Moderate	Northern red oak---- Yellow-poplar-------	80 95	Virginia pine, eastern white pine, yellow-poplar.
18F---------------- Gilpin (South aspect)	3r	Severe	Severe	Moderate	Moderate	Northern red oak---- Yellow-poplar-------	70 80	Virginia pine, eastern white pine.
19C, 20C----------- Jefferson	3o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Shortleaf pine------ Virginia pine-------	70 85 68 70	Eastern white pine, yellow-poplar, Virginia pine, shortleaf pine.
20E---------------- Jefferson (North aspect)	2r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	76 95 76	Yellow-poplar, eastern white pine, Virginia pine.
20E---------------- Jefferson (South aspect)	3r	Moderate	Moderate	Slight	Slight	Northern red oak---- Shortleaf pine------ Virginia pine-------	66 66 70	Eastern white pine, shortleaf pine, Virginia pine.
21C---------------- Jefferson	3x	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Shortleaf pine------ Virginia pine-------	70 85 68 70	Eastern white pine, yellow-poplar, Virginia pine, shortleaf pine.
21E---------------- Jefferson (North aspect)	2x	Slight	Severe	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	76 95 76	Black walnut, yellow-poplar, eastern white pine, Virginia pine.
21E---------------- Jefferson (South aspect)	3x	Moderate	Severe	Slight	Slight	Northern red oak---- Shortleaf pine------ Virginia pine-------	66 66 70	Eastern white pine, shortleaf pine, Virginia pine.
21F---------------- Jefferson (North aspect)	2x	Severe	Severe	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	76 95 76	Black walnut, yellow-poplar, eastern white pine, Virginia pine.
21F---------------- Jefferson (South aspect)	3x	Severe	Severe	Slight	Slight	Northern red oak---- Shortleaf pine------ Virginia pine-------	66 66 70	Eastern white pine, shortleaf pine, Virginia pine.
22D*: Jefferson Variant- (North aspect)	2r	Moderate	Moderate	Slight	Slight	Northern red oak---- Black oak-----------	80 80	Eastern white pine, yellow-poplar, Virginia pine.
Drall------------- (North aspect)	3f	Moderate	Moderate	Moderate	Slight	Northern red oak---- Virginia pine------- Eastern white pine--	75 70 85	Virginia pine, pitch pine.
22D*: Jefferson Variant- (North aspect)	3r	Moderate	Slight	Slight	Slight	Northern red oak---- Virginia pine-------	70 70	Virginia pine, pitch pine.
Drall------------- (South aspect)	4f	Moderate	Moderate	Severe	Slight	Northern red oak---- Virginia pine------- Eastern white pine--	65 60 75	Virginia pine, pitch pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
22F*: Jefferson Variant (North aspect)	2r	Severe	Severe	Slight	Slight	Northern red oak Black oak Yellow-poplar	80 80 ---	Eastern white pine, yellow-poplar, shortleaf pine.
Drall (North aspect)	3f	Moderate	Severe	Moderate	Slight	Northern red oak Virginia pine Eastern white pine	75 70 85	Virginia pine.
22F*: Jefferson Variant (South aspect)	3r	Severe	Severe	Slight	Slight	Northern red oak Black oak	70 70	Virginia pine, shortleaf pine.
Drall (South aspect)	4f	Severe	Severe	Severe	Slight	Northern red oak Virginia pine Eastern white pine	65 60 75	Virginia pine.
23F*: Lehew (North aspect)	3r	Severe	Severe	Slight	Slight	Northern red oak Virginia pine Eastern white pine	67 66 ---	Eastern white pine, Virginia pine.
Wallen (North aspect)	4x	Severe	Severe	Moderate	Slight	Northern red oak Shortleaf pine Virginia pine	60 60 65	Shortleaf pine, Virginia pine.
23F*: Lehew (South aspect)	4r	Severe	Severe	Moderate	Slight	Northern red oak Virginia pine Eastern white pine	58 56 ---	Eastern white pine, Virginia pine.
Wallen (South aspect)	5x	Severe	Severe	Moderate	Slight	Northern red oak Shortleaf pine Virginia pine	55 55 50	Shortleaf pine, Virginia pine.
24C Lily	4o	Slight	Slight	Slight	Slight	Virginia pine Scarlet oak Pitch pine	65 65 65	Virginia pine eastern white pine, shortleaf pine.
24D Lily (North aspect)	4r	Moderate	Moderate	Slight	Slight	Virginia pine Scarlet oak Pitch pine	65 65 65	Virginia pine, eastern white pine, short leaf pine.
24D Lily (South aspect)	5r	Moderate	Moderate	Moderate	Slight	Virginia pine Scarlet oak Pitch pine	55 55 55	Virginia pine, eastern white pine, shortleaf pine.
25F Lily (North aspect)	4r	Severe	Severe	Slight	Slight	Virginia pine Scarlet oak Pitch pine	65 65 65	Virginia pine, eastern white pine.
25F Lily (South aspect)	5r	Severe	Severe	Moderate	Slight	Virginia pine Scarlet oak Pitch pine	55 55 55	Virginia pine, eastern white pine.
26F Lily (North aspect)	4r	Severe	Severe	Slight	Slight	Virginia pine Scarlet oak Pitch pine	65 65 65	Virginia pine, eastern white pine.
26F Lily (South aspect)	5r	Severe	Severe	Moderate	Slight	Virginia pine Scarlet oak Pitch pine	55 55 55	Virginia pine, eastern white pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
27C*: Lily	4o	Slight	Slight	Slight	Slight	Black oak	63	Virginia pine, eastern white pine.
						Virginia pin	65	
						Scarlet oak	65	
						Pitch pine	65	
Bailegap	3o	Slight	Slight	Slight	Slight	Northern red oak	70	Northern red oak, yellow-poplar, eastern white pine.
						Yellow-poplar	80	
						Eastern white pine	80	
27E*: Lily (North aspect)	4r	Moderate	Moderate	Slight	Slight	Virginia pine	65	Virginia pine, eastern white pine.
						Scarlet oak	65	
						Pitch pine	65	
27E*: Bailegap §North aspect)	3r	Moderate	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine, yellow-poplar.
						Yellow-poplar	80	
27E*: Lily (South aspect)	5r	Moderate	Moderate	Moderate	Slight	Virginia pine	55	Virginia pine, eastern white pine.
						Scarlet oak	55	
						Pitch pine	55	
Bailegap (South aspect)	4r	Moderate	Moderate	Moderate	Slight	Northern red oak	60	Shortleaf pine, Virginia pine, yellow-poplar.
27F*: Lily (North aspect)	4r	Severe	Severe	Slight	Slight	Virginia pine	65	Virginia pine, eastern white pine.
						Scarlet oak	65	
						Pitch pine	65	
Bailegap (North aspect)	3r	Severe	Severe	Slight	Slight	Northern red oak	70	Eastern white pine, yellow-poplar.
						Yellow-poplar	80	
27F*: Lily (South aspect)	5r	Severe	Severe	Moderate	Slight	Virginia pine	55	Virginia pine, eastern white pine.
						Scarlet oak	55	
						Pitch pine	55	
Bailegap (South aspect)	4r	Severe	Severe	Moderate	Slight	Northern red oak	60	Shortleaf pine, Virginia pine, yellow-poplar.
28E*: Lily (North aspect)	4r	Moderate	Moderate	Slight	Slight	Virginia pine	65	Virginia pine, eastern white pine.
						Scarlet oak	65	
						Pitch pine	65	
Bailegap (North aspect)	3x	Moderate	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine, yellow-poplar.
						Yellow-poplar	80	
28E*: Lily (South aspect)	5r	Moderate	Moderate	Moderate	Slight	Virginia pine	55	Virginia pine, eastern white pine.
						Scarlet oak	55	
						Pitch pine	55	
Bailegap (South aspect)	4x	Moderate	Moderate	Moderate	Slight	Northern red oak	60	Shortleaf pine, Virginia pine.
29B, 29C Nolichucky	3o	Slight	Slight	Slight	Slight	Yellow-poplar	85	Shortleaf pine, eastern white pine, yellow-poplar.
						Northern red oak	70	
						Shortleaf pine	70	
						Virginia pine	70	
						Eastern white pine	80	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
29D---------------- Nolichucky	3r	Moderate	Moderate	Slight	Slight	Yellow-poplar------- Northern red oak---- Shortleaf pine------ Virginia pine------- Eastern white pine--	85 70 70 70 80	Shortleaf pine, eastern white pine, yellow-poplar.
30C---------------- Nolichucky	3o	Slight	Slight	Slight	Slight	Yellow-poplar------- Northern red oak---- Shortleaf pine------ Virginia pine------- Eastern white pine--	85 70 70 70 80	Shortleaf pine, eastern white pine, yellow-poplar.
30D---------------- Nolichucky	3r	Moderate	Moderate	Slight	Slight	Yellow-poplar------- Northern red oak---- Shortleaf pine------ Virginia pine------- Eastern white pine--	85 70 70 70 80	Shortleaf pine eastern white pine, yellow-poplar.
30F---------------- Nolichucky	3r	Severe	Severe	Slight	Slight	Yellow-poplar------- Northern red oak---- Shortleaf pine------ Virginia pine------- Eastern white pine--	85 70 70 70 80	Shortleaf pine, eastern white pine, yellow-poplar.
31C---------------- Poplimento	2c	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, black walnut, shortleaf pine.
31D, 31E----------- Poplimento	2r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, black walnut, shortleaf pine.
32F*: Rock outcrop.								
Berks------------- (North aspect)	3f	Severe	Severe	Moderate	Slight	Northern red oak---- Black oak----------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine.
32F*: Rock outcrop.								
Berks------------- (South aspect)	4f	Severe	Severe	Moderate	Slight	Northern red oak---- Black oak----------- Virginia pine-------	60 60 60	Virginia pine, eastern white pine.
33D---------------- Sequoia	3r	Moderate	Moderate	Slight	Slight	Northern red oak---- Shortleaf pine------ Virginia pine-------	70 66 71	Shortleaf pine, Virginia pine.
33F---------------- Sequoia	3r	Severe	Severe	Slight	Slight	Northern red oak---- Shortleaf pine------ Virginia pine-------	70 66 71	Shortleaf pine, Virginia pine.
35B, 35C----------- Timberville Variant	2o	Slight	Slight	Slight	Slight	Black walnut-------- Yellow-poplar-------	--- 100	Black walnut, yellow-poplar.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B Allegheny	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight	Slight.
1C Allegheny	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
2D, 2F Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
3F Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
4B Braddock	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
4C Braddock	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
4D Braddock	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
4E Braddock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
5C Carbo	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
5D Carbo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
6F*: Carbo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rock outcrop.					
7 Chagrin	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
8 Chagrin Variant	Severe: flooding.	Slight	Slight	Slight	Slight.
9 Chavies Variant	Severe: flooding.	Slight	Slight	Slight	Slight.
10B Cotaco	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
10C Cotaco	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
11D Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
11F Faywood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
12. Fluvaquents					
13B Frederick	Slight	Slight	Moderate: slope.	Slight	Slight.
13C Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
13D Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
13E Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
14B Frederick	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
14C Frederick	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
14D Frederick	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
14E Frederick	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope, small stones.
15C Frederick	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight	Moderate: slope, large stones.
15D Frederick	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
15E Frederick	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
16D*: Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rock outcrop.					
16F*: Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
17C Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
17D Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17F Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
18D Gilpin	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Moderate: large stones, slope.	Severe: slope.
18F Gilpin	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope.
19C Jefferson	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight	Moderate: small stones.
20C Jefferson	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones, slope.	Slight	Moderate: small stones, large stones.
20E Jefferson	Severe: slope.	Severe: slope.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: slope.
21C Jefferson	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones, slope.	Slight	Moderate: small stones, large stones.
21E, 21F Jefferson	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, small stones, slope.	Severe: slope.	Severe: slope.
22D*: Jefferson Variant	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Moderate: slope, large stones.	Severe: slope.
Drall	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: small stones, large stones, droughty.
22F*: Jefferson Variant	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
Drall	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, small stones, slope.	Severe: small stones, large stones, droughty.
23F*: Lehew	Severe: slope.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
23F*:					
Wallen	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
24C Lily	Moderate: small stones.	Moderate: small stones.	Severe: slope.	Slight	Moderate: small stones, slope.
24D Lily	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
25F, 26F Lily	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
27C*:					
Lily	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight	Moderate: large stones, slope.
Bailegap	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, large stones.
27E*, 27F*:					
Lily	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
Bailegap	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
28E*:					
Lily	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
Bailegap	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
29B Nolichucky	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
29C Nolichucky	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
29D Nolichucky	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
30C Nolichucky	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight	Severe: small stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
30D Nolichucky	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: small stones, slope.
30F Nolichucky	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
31C Poplimento	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
31D Poplimento	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
31F Poplimento	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
32F*: Rock outcrop.					
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope, small stones.
33D Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
33F Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
34*. Slickens					
35B Timberville Variant	Severe: flooding.	Slight	Moderate: slope, flooding.	Slight	Moderate: flooding.
35C Timberville Variant	Severe: flooding.	Moderate: slope.	Severe: slope.	Slight	Moderate: flooding, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1B Allegheny	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
1C Allegheny	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2D Berks	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
2F, 3F Berks	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
4B Braddock	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
4C Braddock	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4D Braddock	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
4E Braddock	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
5C Carbo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
5D Carbo	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
6F*: Carbo	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
7 Chagrin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8 Chagrin Variant	Good	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Good	Very poor.
9 Chavies Variant	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10B Cotaco	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10C Cotaco	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
11D Faywood	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
11F Faywood	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
12. Fluvaquents										
13B Frederick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
13C Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
13D Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
13E Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
14B Frederick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14C Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
14D Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
14E Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
15C Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
15D Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
15E Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
16D*: Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
16F*: Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
17C Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
17D Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
17F, 18D, 18F Gilpin	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
19C Jefferson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
20C Jefferson	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
20E Jefferson	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
21C Jefferson	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
21E, 21F Jefferson	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
22D*:										
Jefferson Variant	Very poor.	Poor	Good	Good	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Drall	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
22F*:										
Jefferson Variant	Very poor.	Very poor.	Good	Good	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Drall	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
23F*:										
Lehew	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Wallen	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
24C Lily	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
24D Lily	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
25F, 26F Lily	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
27C*:										
Lily	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Bailegap	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
27E*:										
Lily	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Bailegap	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
27F*:										
Lily	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Bailegap	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
28E*:										
Lily	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Bailegap	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
29B Nolichucky	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
29C Nolichucky	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
29D Nolichucky	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
30C----------------- Nolichucky	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
30D----------------- Nolichucky	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
30F----------------- Nolichucky	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
31C----------------- Poplimento	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
31D----------------- Poplimento	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
31E----------------- Poplimento	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
32F*: Rock outcrop.										
Berks---------------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
33D----------------- Sequoia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
33F----------------- Sequoia	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
34*. Slickens										
35B----------------- Timberville Variant	Good	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Fair	Very poor.
35C----------------- Timberville Variant	Good	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B Allegheny	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
1C Allegheny	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
2D, 2F Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
3F Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
4B Braddock	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Slight.
4C Braddock	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
4D, 4E Braddock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
5C Carbo	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope, thin layer.
5D Carbo	Severe: slope, depth to rock.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
6F*: Carbo	Severe: slope, depth to rock.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Rock outcrop.						
7 Chagrin	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
8 Chagrin Variant	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
9 Chavies Variant	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
10B Cotaco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.
10C Cotaco	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.
11D, 11F Faywood	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, low strength.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
12. Fluvaquents						
13B Frederick	Moderate: too clayey.	Moderate: shrink-swell.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
13C Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
13D, 13E Frederick	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
14B Frederick	Moderate: too clayey.	Moderate: shrink-swell.	Severe: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: small stones.
14C Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, shrink-swell.	Moderate: slope, small stones.
14D, 14E Frederick	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope, shrink-swell.	Severe: slope, small stones.
15C Frederick	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
15D, 15E Frederick	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
16D*, 16F*: Frederick	Severe: slope.	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
17C Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
17D, 17F, 18D, 18F Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
19C Jefferson	Slight	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones.
20C Jefferson	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: small stones, large stones.
20E Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
21C Jefferson	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: small stones, large stones.
21E, 21F Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
22D*, 22F*:						
Jefferson Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Drall	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, large stones, droughty.
23F*:						
Lehew	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Wallen	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
24C Lily	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	
24D Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	
25F Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
26F Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock. slope.	Severe: slope.	Severe: slope.	
27C*:						
Lily	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: large stones, slope.
Bailegap	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Moderate: small stones, large stones.
27E*, 27F*:						
Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Bailegap	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.
28E*:						
Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Bailegap	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
29B Nolichucky	Slight	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
29C Nolichucky	Moderate: slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
29D Nolichucky	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
30C Nolichucky	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.	Severe: small stones.
30D, 30F Nolichucky	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
31C Poplimento	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
31D, 31E Poplimento	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
32F*: Rock outcrop.						
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
33D, 33F Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
34*. Slickens						
35B Timberville Variant	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, low strength.	Severe: flooding.
35C Timberville Variant	Moderate: flooding, slope.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: flooding, low strength.	Severe: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B Allegheny	Moderate: flooding.	Severe: flooding.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
1C Allegheny	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
2D, 2F Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
3F Berks	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
4B Braddock	Moderate: percs slowly.	Severe: seepage.	Severe: seepage, too clayey.	Slight	Poor: too clayey, hard to pack.
4C Braddock	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
4D, 4E Braddock	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
5C Carbo	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
5D Carbo	Severe: depth to rock, percs slowly, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
6F*:					
Carbo	Severe: depth to rock, percs slowly, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Rock outcrop.					
7 Chagrin	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
8 Chagrin Variant	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
9 Chavies Variant	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage, wetness.	Severe: seepage.	Good.
10B Cotaco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: small stones, wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
10C Cotaco	Severe: wetness.	Severe: wetness, slope.	Severe: wetness.	Severe: seepage, wetness.	Fair: small stones, wetness.
11D, 11F Faywood	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock.	Poor: area reclaim, too clayey, hard to pack.
12. Fluvaquents					
13B Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
13C Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
13D, 13E Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
14B Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey.
14C Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
14D Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey.
14E Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.
15C Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
15D, 15E Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
16D*, 16F*: Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Rock outcrop.					
17C Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
17D, 17F Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
18D, 18F Gilpin	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope, area reclaim, large stones.
19C, 20C Jefferson	Slight	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones.
20E Jefferson	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
21C Jefferson	Slight	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones.
21E, 21F Jefferson	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
22D*, 22F*: Jefferson Variant	Severe: slope.	Severe: slope, seepage.	Severe: seepage, slope.	Severe: slope, seepage.	Poor: slope.
Drall	Severe: slope, poor filter.	Severe: seepage, slope, large stones.	Severe: seepage, depth to rock, slope.	Severe: slope, seepage.	Poor: seepage, too sandy, small stones.
23F*: Lehew	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
Wallen	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
24C Lily	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
24D, 25F, 26F Lily	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
27C*: Lily	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
Bailegap	Severe: large stones.	Severe: slope, large stones.	Severe: depth to rock, large stones.	Moderate: depth to rock, slope.	Poor: large stones.
27E*, 27F*, 28E*: Lily	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
27E*, 27F*, 28E*:					
Bailegap	Severe: slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
29B Nolichucky	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
29C Nolichucky	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Fair: too clayey, small stones.
29D Nolichucky	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Fair: too clayey, small stones.
30C Nolichucky	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
30D, 30F Nolichucky	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
31C Poplimento	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
31D, 31E Poplimento	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
32F*: Rock outcrop.					
Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
33D, 33F Sequoia	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: slope, depth to rock.	Poor: area reclaim, too clayey, hard to pack.
34*. Slickens					
35B Timberville Variant	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
35C Timberville Variant	Severe: flooding, wetness.	Severe: flooding, slope, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, slope, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B Allegheny	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
1C Allegheny	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim, slope.
2D, 2F Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
3F Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
4B, 4C Braddock	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
4D Braddock	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
4E Braddock	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
5C Carbo	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, large stones.
5D Carbo	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, large stones.
6F*:				
Carbo	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, large stones.
Rock outcrop.				
7 Chagrin	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
8 Chagrin Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
9 Chavies Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
10B Cotaco	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
10C------------------- Cotaco	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
11D------------------- Faywood	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
11F------------------- Faywood	Poor: area reclaim, slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
12. Fluvaquents				
13B, 13C-------------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, thin layer.
13D------------------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, thin layer.
13E------------------- Frederick	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, thin layer.
14B, 14C-------------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
14D------------------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
14E------------------- Frederick	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
15C------------------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, thin layer.
15D------------------- Frederick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, thin layer.
15E------------------- Frederick	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, thin layer.
16D*:				
Frederick------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, thin layer.
Rock outcrop.				
16F*:				
Frederick------------	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, thin layer.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
16F*: Rock outcrop.				
17C------------------- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
17D------------------- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
17F------------------- Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
18D------------------- Gilpin	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones, small stones.
18F------------------- Gilpin	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones, small stones.
19C------------------- Jefferson	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
20C------------------- Jefferson	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
20E------------------- Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
21C------------------- Jefferson	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
21E, 21F-------------- Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
22D*: Jefferson Variant----	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim, large stones.
Drall----------------	Fair: slope, area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
22F*: Jefferson Variant----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim, large stones.
Drall----------------	Poor: slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
23F*: Lehew----------------	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
23F*:				
Wallen	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
24C Lily	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
24D Lily	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
25F, 26F Lily	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
27C*:				
Lily	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Bailegap	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
27E*, 27F*, 28E*:				
Lily	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Bailegap	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
29B, 29C Nolichucky	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
29D Nolichucky	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
30C Nolichucky	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, large stones, slope.
30D Nolichucky	Fair: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
30F Nolichucky	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
31C Poplimento	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
31D Poplimento	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
31E Poplimento	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
32F*: Rock outcrop.				
Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
33D Sequoia	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
33F Sequoia	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
34*. Slickens				
35B Timberville Variant	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
35C Timberville Variant	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
1B Allegheny	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
1C Allegheny	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
2D, 2F Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
3F Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Depth to rock, large stones, slope.
4B Braddock	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable	Favorable.
4C, 4D, 4E Braddock	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
5C, 5D Carbo	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
6F*: Carbo	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
7 Chagrin	Moderate: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Favorable	Favorable.
8 Chagrin Variant	Severe: seepage.	Severe: seepage; piping.	Severe: no water.	Deep to water	Too sandy	Droughty.
9 Chavies Variant	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Favorable	Droughty.
10B Cotaco	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Slope	Erodes easily, wetness.	Erodes easily.
10C Cotaco	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Slope	Erodes easily, wetness, slope.	Erodes easily.
11D, 11F Faywood	Severe: slope.	Severe: thin layer, hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
12. Fluvaquents						
13B Frederick	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable	Favorable.
13C, 13D, 13E Frederick	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
14B--------------- Frederick	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
14C, 14D, 14E, 15C, 15D, 15E---- Frederick	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
16D*, 16F*: Frederick--------	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Rock outcrop.						
17C, 17D, 17F----- Gilpin	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
18D, 18F---------- Gilpin	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
19C--------------- Jefferson	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
20C--------------- Jefferson	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones---	Large stones.
20E--------------- Jefferson	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Slope, large stones.
21C--------------- Jefferson	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones---	Large stones.
21E, 21F---------- Jefferson	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Slope, large stones.
22D*, 22F*: Jefferson Variant	Severe: slope, seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Slope, droughty, large stones.
Drall------------	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, too sandy, slope.	Droughty, large stones, slope.
23F*: Lehew------------	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, droughty.
Wallen-----------	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
24C--------------- Lily	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Large stones, depth to rock.	Large stones, depth to rock.
24D, 25F, 26F----- Lily	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
27C*, 27E*, 27F*, 28E*:						
Lily	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Bailegap	Severe: slope.	Severe: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
29B Nolichucky	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Favorable	Favorable.
29C Nolichucky	Moderate: seepage.	Slight	Severe: no water.	Deep to water	Slope	Slope.
29D Nolichucky	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Slope.
30C, 30D, 30F Nolichucky	Severe: seepage, slope.	Moderate: large stones, piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
31C, 31D, 31E Poplimento	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope	Slope.
32F*: Rock outcrop.						
Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
33D, 33F Sequoia	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
34*. Slickens						
35B Timberville Variant	Moderate: seepage, slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Deep to water	Favorable	Favorable.
35C Timberville Variant	Severe: slope.	Moderate: wetness.	Moderate: deep to water, slow refill.	Deep to water	Slope	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1B, 1C Allegheny	0-7	Loam	ML, CL, CL-ML	A-4	0	90-100	80-100	65-100	55-95	<35	NP-10
	7-39	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	80-100	65-95	35-80	<35	NP-15
	39-60	Clay loam, sandy loam, gravelly sandy loam.	SM, GC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
2D, 2F Berks	0-8	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	8-23	Shaly loam, very shaly silt loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
3F Berks	0-8	Very stony silt loam.	GM, SM, GC, SC	A-2, A-4	15-30	40-80	35-70	30-60	25-45	25-36	5-10
	8-23	Shaly loam, very shaly silt loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
4B, 4C, 4D, 4E Braddock	0-11	Sandy loam	CL, SM, ML, SC	A-2, A-4	0-5	85-100	75-95	50-85	25-65	<30	NP-10
	11-80	Clay loam, gravelly sandy clay, clay.	MH, CH, CL, SC	A-7, A-2	0-15	70-95	70-90	45-90	20-80	42-60	15-33
5C, 5D Carbo	0-5	Silty clay loam	CL	A-6, A-7	0-2	95-100	90-100	85-95	75-85	30-50	10-15
	5-25	Clay	CH	A-7	0-5	95-100	85-100	80-95	70-90	60-80	35-55
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
6F*: Carbo	0-5	Silty clay loam	CL	A-6, A-7	0-2	95-100	90-100	85-95	75-85	30-50	10-15
	5-25	Clay	CH	A-7	0-5	95-100	85-100	80-95	70-90	60-80	35-55
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
7 Chagrin	0-9	Silt loam	ML, CL, CL-ML	A-4	0	95-100	85-100	80-100	70-90	20-35	2-10
	9-42	Silt loam, loam, sandy loam.	ML, SM	A-4, A-2, A-6	0	90-100	75-100	55-90	30-80	20-40	NP-14
	42-60	Stratified silt loam to fine sandy loam.	ML, SM	A-4, A-2	0	85-100	75-100	50-85	15-80	20-40	NP-10
8 Chagrin Variant	0-30	Sandy loam	SM	A-2	0	95-100	95-100	50-75	12-30	---	NP
	30-65	Loamy sand, sand	SM, SP-SM	A-2	0	95-100	95-100	50-80	12-30	---	NP
9 Chavies Variant	0-11	Sandy loam	SM, SM-SC	A-2, A-4	0-5	95-100	95-100	64-85	20-40	<25	NP-5
	11-23	Loamy fine sand, sandy loam.	SM, SC, CL	A-2	0	95-100	95-100	64-85	25-55	<25	NP-10
	23-60	Sandy loam	SM, SC	A-2, A-4	0	95-100	95-100	55-70	25-50	<25	NP-10
10B, 10C Cotaco	0-11	Loam	ML, CL-ML, SM, SM-SC	A-4	0-5	80-100	75-95	55-85	35-80	<30	NP-7
	11-60	Gravelly sandy clay loam, clay loam, loam.	SC, SM, GC, CL	A-2, A-4, A-6, A-1-B	0-10	60-100	50-95	40-70	20-70	<35	NP-15

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
11D, 11F--------- Faywood	0-3	Silt loam--------	ML, CL, CL-ML	A-4	0-15	100	95-100	90-100	85-100	25-35	4-10
	3-36	Shaly silty clay, clay, silty clay loam.	CH, CL	A-7	0-15	90-100	90-100	85-100	75-100	42-70	20-45
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
12. Fluvaquents											
13B, 13C, 13D, 13E-------------- Frederick	0-10	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	10-16	Silt loam, silty clay loam, cherty silty clay loam.	CL, CL-ML	A-6, A-7	0-5	80-100	60-100	55-100	50-95	20-45	5-25
	16-28	Silty clay, clay, cherty clay.	CH, MH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	20-40
	28-54	Clay, clay loam, silty clay.	CH, MH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
	54-80	Clay, silty clay	CH	A-7	0-5	90-100	85-100	75-100	65-95	60-85	25-55
14B, 14C, 14D, 14E-------------- Frederick	0-10	Cherty silt loam	GM, GC, ML	A-4, A-6	0-10	50-80	45-75	40-75	35-70	<35	NP-15
	10-16	Silt loam, silty clay loam, cherty silty clay loam.	CL, GC, GM-GC	A-6, A-7	0-5	70-100	60-100	55-100	45-95	20-45	5-25
	16-54	Silty clay, clay, cherty clay.	CH, MH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	20-40
	54-80	Clay, silty clay	CH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	25-55
15C, 15D, 15E---- Frederick	0-10	Very stony silt loam.	ML, CL, CL-ML	A-4, A-6	10-30	80-100	75-100	75-95	75-90	<35	NP-15
	10-16	Silt loam, silty clay loam, cherty silty clay loam.	CL, CL-ML	A-6, A-7	0-5	80-100	60-100	55-100	50-95	20-45	5-25
	16-54	Silty clay, clay, cherty clay.	CH, MH-CH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	20-40
	54-80	Clay, clay loam, silty clay.	CH, ML-CH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
16D*: Frederick--------	0-10	Cherty silt loam	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	10-16	Silt loam, silty clay loam, cherty silty clay loam.	CL, CL-ML	A-6, A-7	0-5	80-100	60-100	55-100	50-95	20-45	5-25
	16-54	Silty clay, clay, cherty clay.	CH, MH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	20-40
	54-80	Clay, clay loam, silty clay.	CH, MH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
16F*: Frederick--------	0-10	Cherty silt loam	ML, CL, CL-ML	A-4, A-6	0-5	80-100	75-100	75-95	75-90	<35	NP-15
	10-16	Silt loam, silty clay loam, cherty silty clay loam.	CL, CL-ML	A-6, A-7	0-5	80-100	60-100	55-100	50-95	20-45	5-25
	16-54	Silty clay, clay, cherty clay.	CH, MH	A-7	0-5	80-100	65-100	65-100	65-100	50-70	20-40
	54-80	Clay, clay loam, silty clay.	CH, MH	A-7	0-5	90-100	85-100	70-100	60-95	60-85	30-55
Rock outcrop.											
17C, 17D, 17F---- Gilpin	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	7-29	Channery loam, shaly silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	29-34	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
18D, 18F---------- Gilpin	0-7	Very stony silt loam.	GC, CL, SC, CL-ML	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	7-29	Shaly silt loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	29-34	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
19C-------------- Jefferson	0-10	Loam-------------	SM, SC, ML, CL	A-2, A-4	0-5	75-90	50-90	50-80	30-65	20-35	2-10
	10-46	Loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	0-5	75-90	50-90	50-80	30-70	15-35	2-15
	46-60	Gravelly loam, gravelly clay loam, sandy clay loam.	GM, SM, ML, GM-GC	A-2, A-4, A-1	0-5	55-75	25-75	20-70	10-60	20-35	2-10
20C, 20E--------- Jefferson	0-10	Very stony loam	SM, GM, ML, CL	A-2, A-4	5-20	65-90	60-90	50-80	30-60	20-35	2-10
	10-46	Channery loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	46-60	Very channery loam, gravelly clay loam, sandy clay loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	5-25	55-75	50-75	35-70	20-60	20-35	2-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
21C, 21E, 21F---- Jefferson	0-10	Extremely stony loam.	SM, GM, ML, CL	A-2, A-4	5-20	65-90	60-90	50-80	30-60	20-35	2-10
	10-46	Channery loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	46-60	Very channery loam, gravelly clay loam, sandy clay loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	5-25	55-75	50-75	35-70	20-60	20-35	2-10
22D*, 22F*: Jefferson Variant--------	0-9	Very stony sandy loam.	SM, SM-SC	A-2, A-4	25-40	95-100	75-90	50-65	25-35	<25	NP-5
	9-45	Sandy loam--------	SM, SC, SM-SC	A-2, A-4	0-20	90-100	80-95	50-65	40-50	<25	NP-10
	45-65	Gravelly loamy sand, gravelly sand.	SM	A-2	0-20	70-85	55-75	30-55	10-20	---	NP
Drall-----------	0-9	Very stony loamy sand.	SW-SM, SM	A-1, A-2-4	10-25	70-85	40-75	25-50	5-25	<20	NP-10
	9-24	Very channery sand, very channery loamy sand.	SW, SM, GW, GM	A-1, A-2-4	10-30	30-60	15-45	10-30	4-15	<20	NP-10
	24-47	Very cobbly loamy sand, very cobbly sand.	SM, SW	A-1	20-50	50-65	20-55	10-45	2-20	<100	NP
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
23F*: Lehew-----------	0-12	Very stony loam---	SM, GM, ML, CL-ML	A-2, A-4	5-25	50-90	45-80	40-75	20-55	15-30	NP-7
	12-29	Very channery sandy loam, channery fine sandy loam, channery loam.	SM, GM, GM-GC, SM-SC	A-2, A-4	5-40	45-75	30-65	20-55	10-40	15-30	NP-7
	29-37	Very channery sandy loam, very channery fine sandy loam, channery loam.	SM, GM, GM-GC, SM-SC	A-2, A-4	10-50	45-75	30-65	20-55	10-40	15-30	NP-7
	37	Weathered bedrock	---	---	---	---	---	---	---	---	---
Wallen----------	0-8	Very stony sandy loam.	SM, GM, ML, SM-SC	A-2, A-4	5-20	50-90	50-80	45-75	25-55	<35	NP-10
	8-31	Very channery sandy loam, very cobbly loam, very cobbly fine sandy loam.	SM, GM, GM-GC, SM-SC	A-2, A-4, A-1	20-55	35-65	30-60	20-50	10-40	<35	NP-10
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
24C, 24D--------- Lily	0-7	Gravelly sandy loam.	SM, ML	A-2, A-4	5-20	90-95	85-90	55-90	25-75	<35	NP-7
	7-30	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	5-20	90-95	85-90	60-85	40-80	<35	3-15
	30-36	Sandy clay loam, loam, gravelly loam.	SM, GC, ML, CL	A-2, A-4, A-6	5-20	65-95	60-90	50-85	20-75	<35	NP-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
25F---------------- Lily	0-7	Extremely stony sandy loam.	SM, ML	A-2, A-4	20-50	90-95	85-90	55-90	25-75	<35	NP-7
	7-30	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	5-20	90-95	85-90	60-85	40-80	<35	3-15
	30-36	Sandy clay loam, loam, gravelly loam.	SM, GC, ML, CL	A-2, A-4, A-6	5-20	65-95	60-90	50-85	20-75	<35	NP-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
26F---------------- Lily	0-7	Gravelly sandy loam.	SM, ML	A-2, A-4	5-20	90-95	85-90	55-90	25-75	<35	NP-7
	7-30	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	5-20	90-95	85-90	60-85	40-80	<35	3-15
	30-36	Sandy clay loam, loam, gravelly loam.	SM, GC, ML, CL	A-2, A-4, A-6	5-20	65-95	60-90	50-85	20-75	<35	NP-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
27C*, 27E*, 27F*: Lily-------------	0-7	Very stony sandy loam.	SM, ML	A-2, A-4	5-20	90-95	85-90	55-90	25-75	<35	NP-7
	7-30	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	5-20	90-95	85-90	60-85	40-80	<35	3-15
	30-36	Sandy clay loam, loam, gravelly loam.	SM, GC, ML, CL	A-2, A-4, A-6	5-20	65-95	60-90	50-85	20-75	<35	NP-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Bailegap---------	0-8	Very stony loam	ML, CL, CL-ML	A-4, A-6, A-2	5-25	75-95	70-85	60-80	40-70	15-35	NP-15
	8-20	Gravelly silt loam, angular cobbly loam, sandy clay loam.	CL, CL-ML, SC	A-4, A-6, A-2	5-60	50-95	45-90	40-80	30-70	20-35	5-15
	20-42	Angular cobbly silt loam, angular cobbly sandy clay loam, gravelly sandy loam.	CL, CL-ML, SC	A-4, A-6, A-2	5-60	50-90	35-80	30-75	25-70	20-40	5-20
	42-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
28E*: Lily-------------	0-7	Extremely stony sandy loam.	SM, ML	A-2, A-4	20-50	90-95	85-90	55-90	25-75	<35	NP-7
	7-30	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	5-20	90-95	85-90	60-85	40-80	<35	3-15
	30-36	Sandy clay loam, loam, gravelly loam.	SM, GC, ML, CL	A-2, A-4, A-6	5-20	65-95	60-90	50-85	20-75	<35	NP-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Bailegap---------	0-8	Extremely stony loam.	SM, SC, CL, CL-ML	A-4, A-2	15-50	75-95	60-80	50-75	30-55	10-30	NP-10
	8-20	Gravelly silt loam, angular cobbly loam, sandy clay loam.	CL, CL-ML, SC	A-4, A-6, A-2	5-60	50-95	45-90	40-80	30-70	20-35	5-15
	20-42	Angular cobbly silt loam, angular cobbly sandy clay loam, gravelly sandy loam.	CL, CL-ML, SC	A-4, A-6, A-2	5-60	50-90	35-80	30-75	25-70	20-40	5-20
	42-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
29B, 29C, 29D---- Nolichucky	0-8	Loam-------------	ML, CL, CL-ML, SM	A-4, A-2	0-5	80-100	75-100	50-95	30-85	15-25	3-10
	8-15	Clay loam, gravelly clay loam, loam.	SC, GC, CL	A-4, A-2, A-6	0-20	60-100	55-100	45-90	20-75	25-35	8-15
	15-70	Clay loam, gravelly clay loam.	CL, SC, GC	A-6, A-7, A-2	0-20	60-100	55-100	45-95	25-85	35-45	15-22
30C, 30D, 30F---- Nolichucky	0-8	Very stony sandy loam.	GW-GM, GM, SM	A-1, A-2, A-4	5-20	40-65	35-60	25-50	10-40	<30	NP-10
	8-15	Sandy clay loam, gravelly sandy loam, loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0-15	65-95	60-95	50-80	25-65	20-30	5-15
	15-70	Sandy clay loam, clay loam, gravelly clay loam.	GC, SC, CL	A-6, A-7	0-15	65-100	60-100	50-95	36-70	30-50	11-25
31C, 31D, 31E---- Poplimento	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0-5	80-100	75-100	65-100	50-90	25-40	5-15
	7-19	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	65-95	60-90	45-65	30-60
	19-29	Shaly silty clay loam, shaly silty clay, clay.	CL, CH, GC	A-6, A-7	0-10	45-90	40-85	35-80	30-75	35-55	15-30
	29-72	Shaly silty clay, very shaly silty clay loam, clay.	CL, CH, GC	A-2, A-6, A-7	0-15	30-80	20-70	20-65	15-60	35-55	15-30
32F*: Rock outcrop.											
Berks-----------	0-8	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	8-23	Shaly loam, very shaly silt loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
33D, 33F--------- Sequoia	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	95-100	85-100	80-95	23-35	5-15
	7-32	Silty clay, clay, shaly silty clay, silty clay loam.	CL, MH, CH	A-7	0	70-100	65-100	60-100	55-95	43-74	20-40
	32-73	Weathered bedrock	---	---	---	---	---	---	---	---	---
34*. Slickens											
35B, 35C--------- Timberville Variant	0-17	Loam-------------	ML, CL-ML	A-4	0-5	95-100	95-100	85-95	55-70	<40	NP-10
	17-39	Clay loam--------	CL	A-4, A-6	0-5	95-100	95-100	90-95	65-80	25-50	15-30
	39-85	Cherty clay loam	CL, GC	A-2, A-4, A-6	0-5	80-90	55-75	50-75	40-60	25-50	15-30

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
1B, 1C-----------	0-7	15-27	1.20-1.40	0.6-2.0	0.12-0.22	4.5-5.5	Low-----------	0.32	4	1-4
Allegheny	7-39	18-35	1.20-1.50	0.6-2.0	0.13-0.18	4.5-5.5	Low-----------	0.28		
	39-60	10-35	1.20-1.40	0.6-2.0	0.08-0.17	4.5-5.5	Low-----------	0.28		
2D, 2F-----------	0-8	5-23	1.20-1.50	0.6-6.0	0.08-0.12	4.5-5.5	Low-----------	0.17	3	.5-3
Berks	8-23	5-32	1.20-1.60	0.6-6.0	0.04-0.10	4.5-5.5	Low-----------	0.17		
	23	---	---	---	---	---	-------------	----		
3F---------------	0-8	5-23	1.20-1.50	0.6-6.0	0.08-0.12	4.5-5.5	Low-----------	0.17	3	.5-3
Berks	8-23	5-32	1.20-1.60	0.6-6.0	0.04-0.10	4.5-5.5	Low-----------	0.17		
	23	---	---	---	---	---	-------------	----		
4B, 4C, 4D, 4E---	0-11	10-25	1.20-1.50	0.6-6.0	0.14-0.19	4.5-5.5	Low-----------	0.32	4	1-2
Braddock	11-80	35-55	1.20-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Moderate-----	0.24		
5C, 5D-----------	0-5	20-40	1.20-1.40	0.6-2.0	0.16-0.19	6.1-7.3	Moderate-----	0.37	2	.5-3
Carbo	5-25	60-80	1.30-1.50	0.06-0.2	0.10-0.14	6.1-7.3	High---------	0.24		
	25	---	---	---	---	---	-------------	----		
6F*:										
Carbo------------	0-5	20-40	1.20-1.40	0.6-2.0	0.16-0.19	6.1-7.3	Moderate-----	0.37	2	.5-3
	5-25	60-80	1.30-1.50	0.06-0.2	0.10-0.14	6.1-7.3	High---------	0.24		
	25	---	---	---	---	---	-------------	----		
Rock outcrop.										
7----------------	0-9	10-27	1.20-1.40	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.32	5	2-4
Chagrin	9-42	18-30	1.20-1.50	0.6-2.0	0.14-0.20	5.6-7.3	Low-----------	0.32		
	42-60	5-25	1.20-1.40	0.6-2.0	0.08-0.20	5.6-7.3	Low-----------	0.32		
8----------------	0-30	0-15	1.20-1.40	2.0-20	0.06-0.08	6.1-7.3	Low-----------	0.10	5	1-2
Chagrin Variant	30-65	0-15	1.20-1.40	2.0-20	0.04-0.08	6.1-7.3	Low-----------	0.10		
9----------------	0-11	5-20	1.25-1.50	2.0-6.0	0.10-0.13	6.6-7.8	Low-----------	0.24	4	1-2
Chavies Variant	11-23	5-15	1.25-1.50	2.0-6.0	0.08-0.12	6.6-7.8	Low-----------	0.28		
	23-60	5-20	1.25-1.50	2.0-6.0	0.10-0.13	6.6-7.8	Low-----------	0.28		
10B, 10C---------	0-11	7-27	1.20-1.40	0.6-6.0	0.12-0.20	3.6-5.5	Low-----------	0.37	3	.5-4
Cotaco	11-60	18-35	1.20-1.50	0.6-2.0	0.07-0.15	3.6-5.5	Low-----------	0.28		
11D, 11F---------	0-3	15-27	1.30-1.40	0.6-2.0	0.18-0.22	5.6-7.3	Low-----------	0.37	3	1-4
Faywood	3-36	35-60	1.35-1.45	0.06-0.6	0.12-0.17	5.6-7.3	Moderate-----	0.28		
	36	---	---	---	---	---	-------------	----		
12. Fluvaquents										
13B, 13C, 13D,										
13E--------------	0-10	13-23	1.25-1.50	2.0-6.0	0.15-0.24	4.5-5.5	Low-----------	0.32	4	1-3
Frederick	10-16	20-40	1.40-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	16-28	40-75	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	Moderate-----	0.24		
	28-54	50-85	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	High---------	0.24		
	54-80	45-80	1.40-1.65	0.6-2.0	0.09-0.20	4.5-5.5	Moderate-----	0.24		
14B, 14C, 14D,										
14E--------------	0-10	13-35	1.25-1.55	2.0-6.0	0.12-0.20	4.5-5.5	Low-----------	0.28	4	1-3
Frederick	10-16	20-40	1.40-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	16-54	40-75	1.40-1.65	0.6-2.0	0.10-0.18	4.5-5.5	Moderate-----	0.24		
	54-80	50-85	1.40-1.65	0.6-2.0	0.10-0.18	4.5-5.5	High---------	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
15C, 15D, 15E---- Frederick	0-10	13-23	1.25-1.50	2.0-6.0	0.15-0.24	4.5-5.5	Low-----------	0.32	4	1-3
	10-16	20-40	1.40-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	16-54	40-75	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	Moderate-----	0.24		
	54-80	50-85	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	High---------	0.24		
16D*: Frederick-------	0-10	13-23	1.25-1.50	2.0-6.0	0.15-0.24	4.5-5.5	Low-----------	0.32	4	1-3
	10-16	20-40	1.40-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	16-54	40-75	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	Moderate-----	0.24		
	54-80	50-85	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	High---------	0.24		
Rock outcrop.										
16F*: Frederick-------	0-10	13-23	1.25-1.50	2.0-6.0	0.15-0.24	4.5-5.5	Low-----------	0.32	4	1-3
	10-16	20-40	1.40-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.24		
	16-54	40-75	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	Moderate-----	0.24		
	54-80	50-85	1.40-1.65	0.6-2.0	0.09-0.18	4.5-5.5	High---------	0.24		
Rock outcrop.										
17C, 17D, 17F---- Gilpin	0-7	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low-----------	0.32	3	1-4
	7-29	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low-----------	0.24		
	29-34	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low-----------	0.24		
	34	---	---	---	---	---	---	----		
18D, 18F--------- Gilpin	0-7	15-27	1.20-1.40	0.6-2.0	0.08-0.14	3.6-5.5	Low-----------	0.24	3	1-4
	7-29	18-35	1.20-1.50	0.6-2.0	0.10-0.16	3.6-5.5	Low-----------	0.24		
	29-34	15-35	1.20-1.50	0.6-2.0	0.06-0.10	3.6-5.5	Low-----------	0.24		
	34	---	---	---	---	---	---	----		
19C-------------- Jefferson	0-10	10-25	1.30-1.50	2.0-6.0	0.10-0.16	4.5-5.5	Low-----------	0.17	4	.5-5
	10-46	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low-----------	0.28		
	46-60	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low-----------	0.17		
20C, 20E, 21C, 21E, 21F-------- Jefferson	0-10	10-25	1.30-1.50	2.0-6.0	0.10-0.16	4.5-5.5	Low-----------	0.10	4	.5-5
	10-46	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low-----------	0.28		
	46-60	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low-----------	0.17		
22D*, 22F*: Jefferson Variant--------	0-9	0-18	1.15-1.35	2.0-6.0	0.06-0.09	4.5-5.5	Low-----------	0.24	4	1-2
	9-45	0-18	1.15-1.35	2.0-6.0	0.08-0.12	4.5-5.5	Low-----------	0.28		
	45-65	0-15	1.15-1.35	2.0-6.0	0.03-0.06	4.5-5.5	Low-----------	0.20		
Drall-----------	0-9	5-18	1.40-1.50	6.0-20	0.04-0.08	4.5-5.5	Low-----------	0.17	3	.5-2
	9-24	5-14	1.45-1.55	6.0-20	0.04-0.08	4.5-5.5	Low-----------	0.17		
	24-47	5-10	1.45-1.55	6.0-20	0.02-0.08	4.5-5.5	Low-----------	0.17		
	47	---	---	---	---	---	---	----		
23F*: Lehew-----------	0-12	4-16	1.20-1.40	2.0-20	0.08-0.12	4.5-5.5	Low-----------	0.17	3	1-4
	12-29	5-18	1.20-1.40	2.0-20	0.06-0.10	4.5-5.5	Low-----------	0.17		
	29-37	5-18	1.20-1.40	2.0-20	0.06-0.10	4.5-5.5	Low-----------	0.17		
	37	---	---	---	---	---	---	----		
Wallen----------	0-8	8-20	1.40-1.55	2.0-6.0	0.08-0.12	4.5-6.0	Low-----------	0.17	2	1-4
	8-31	8-20	1.40-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low-----------	0.17		
	31	---	---	---	---	---	---	----		
24C, 24D--------- Lily	0-7	5-25	1.20-1.40	0.6-6.0	0.09-0.16	4.5-5.5	Low-----------	0.24	3	.5-4
	7-30	18-35	1.25-1.55	2.0-6.0	0.12-0.18	4.5-5.5	Low-----------	0.24		
	30-36	18-35	1.25-1.55	2.0-6.0	0.08-0.17	4.5-5.5	Low-----------	0.17		
	36	---	---	---	---	---	---	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
25F-------------- Lily	0-7	5-25	1.20-1.40	0.6-6.0	0.09-0.16	4.5-5.5	Low-----------	0.17	3	.5-4
	7-30	18-35	1.25-1.55	2.0-6.0	0.12-0.18	4.5-5.5	Low-----------	0.24		
	30-36	18-35	1.25-1.55	2.0-6.0	0.08-0.17	4.5-5.5	Low-----------	0.17		
	36	---	---	---	---	---	-------------	----		
26F-------------- Lily	0-7	5-25	1.20-1.40	0.6-6.0	0.09-0.16	4.5-5.5	Low-----------	0.24	3	.5-4
	7-30	18-35	1.25-1.55	2.0-6.0	0.12-0.18	4.5-5.5	Low-----------	0.24		
	30-36	18-35	1.25-1.55	2.0-6.0	0.08-0.17	4.5-5.5	Low-----------	0.17		
	36	---	---	---	---	---	-------------	----		
27C*, 27E*, 27F*:										
Lily------------	0-7	5-25	1.20-1.40	0.6-6.0	0.09-0.16	4.5-5.5	Low-----------	0.24	3	.5-4
	7-30	18-35	1.25-1.55	2.0-6.0	0.12-0.18	4.5-5.5	Low-----------	0.24		
	30-36	18-35	1.25-1.55	2.0-6.0	0.08-0.17	4.5-5.5	Low-----------	0.17		
	36	---	---	---	---	---	-------------	----		
Bailegap--------	0-8	10-25	1.30-1.55	0.6-2.0	0.11-0.14	4.5-5.0	Low-----------	0.17	3	.5-2
	8-20	18-27	1.35-1.65	0.6-2.0	0.08-0.14	4.5-5.0	Low-----------	0.24		
	20-42	15-30	1.35-1.65	0.6-2.0	0.08-0.14	4.5-5.0	Low-----------	0.24		
	42-60	---	---	---	---	---	-------------	----		
28E*:										
Lily------------	0-7	5-25	1.20-1.40	0.6-6.0	0.09-0.16	3.6-5.5	Low-----------	0.17	3	.5-4
	7-30	18-35	1.25-1.55	2.0-6.0	0.12-0.18	3.6-5.5	Low-----------	0.24		
	30-36	18-35	1.25-1.55	2.0-6.0	0.08-0.17	3.6-5.5	Low-----------	0.17		
	36	---	---	---	---	---	-------------	----		
Bailegap--------	0-8	5-20	1.35-1.65	0.6-2.0	0.09-0.11	4.5-5.0	Low-----------	0.17	3	.5-2
	8-20	18-27	1.35-1.65	0.6-2.0	0.08-0.14	4.5-5.0	Low-----------	0.24		
	20-42	15-30	1.35-1.65	0.6-2.0	0.08-0.14	4.5-5.0	Low-----------	0.24		
	42-60	---	---	---	---	---	-------------	----		
29B, 29C, 29D, 30C, 30D, 30F--- Nolichucky	0-8	10-20	1.30-1.45	0.6-2.0	0.06-0.08	4.5-5.5	Low-----------	0.20	5	.5-2
	8-15	15-30	1.30-1.45	0.6-2.0	0.12-0.18	4.5-5.5	Low-----------	0.20		
	15-70	25-40	1.40-1.55	0.6-2.0	0.12-0.14	4.5-5.5	Moderate-----	0.20		
31C, 31D, 31E---- Poplimento	0-7	17-27	1.20-1.35	0.6-2.0	0.15-0.22	4.5-6.0	Low-----------	0.32	4	.5-2
	7-19	35-60	1.30-1.60	0.2-0.6	0.10-0.14	4.5-6.0	High----------	0.24		
	19-29	30-55	1.30-1.55	0.2-0.6	0.07-0.14	5.1-6.5	High----------	0.24		
	29-72	27-50	1.25-1.50	0.2-0.6	0.05-0.12	5.1-6.5	Moderate-----	0.24		
32F*: Rock outcrop.										
Berks-----------	0-8	5-23	1.20-1.50	0.6-6.0	0.08-0.12	4.5-5.5	Low-----------	0.17	3	.5-3
	8-23	5-32	1.20-1.60	0.6-6.0	0.04-0.10	4.5-5.5	Low-----------	0.17		
	23	---	---	---	---	---	-------------	----		
33D, 33F--------- Sequoia	0-7	15-27	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low-----------	0.37	3	.5-2
	7-32	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate-----	0.24		
	32-73	---	---	---	---	---	-------------	----		
34*. Slickens										
35B, 35C--------- Timberville Variant	0-17	10-22	1.25-1.45	0.6-2.0	0.14-0.17	6.1-7.3	Low-----------	0.28	4	2-4
	17-39	27-40	1.30-1.60	0.6-2.0	0.16-0.19	5.6-7.3	Moderate-----	0.28		
	39-85	27-40	1.30-1.60	0.6-2.0	0.08-0.15	5.1-6.5	Moderate-----	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
1B Allegheny	B	Rare	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
1C Allegheny	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
2D, 2F, 3F Berks	C	None	---	---	>6.0	---	---	20-30	Soft	Low	Low	High.
4B, 4C, 4D, 4E Braddock	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
5C, 5D Carbo	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High	Low.
6F*: Carbo	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High	Low.
Rock outcrop.												
7 Chagrin	B	Frequent	Brief	Nov-May	4.0-6.0	Apparent	Feb-Mar	>60	---	Moderate	Low	Moderate.
8 Chagrin Variant	A	Rare	---	---	>6.0	---	---	>60	---	Low	Low	Low.
9 Chavies Variant	B	Rare	---	---	>3.5	Apparent	Nov-May	>60	---	Low	Low	Low.
10B, 10C Cotaco	C	None	---	---	1.5-2.5	Apparent	Nov-May	>60	---	Moderate	Moderate	High.
11D, 11F Faywood	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High	Moderate.
12. Fluvaquents												
13B, 13C, 13D, 13E, 14B, 14C, 14D, 14E, 15C, 15D, 15E Frederick	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
16D*, 16F*: Frederick	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
Rock outcrop.												
17C, 17D, 17F, 18D, 18F Gilpin	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
19C--------------- Jefferson	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
20C, 20E, 21C, 21E, 21F--------- Jefferson	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
22D*, 22F*: Jefferson Variant	B	None--------	---	---	>6.0	---	---	>60	Hard	Low------	Low------	High.
Drall------------	B	None--------	---	---	>6.0	---	---	40-60	Hard	Low------	Low------	High.
23F*: Lehew------------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
Wallen-----------	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
24C, 24D, 25F, 26F--------------- Lily	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Moderate	High.
27C*, 27E*, 27F*, 28E*: Lily------------	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Moderate	High.
Bailegap--------	B	None--------	---	---	>6.0	---	---	40-60	Hard	Low------	Low------	High.
29B, 29C, 29D----- Nolichucky	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
30C, 30D, 30F----- Nolichucky	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
31C, 31D, 31E----- Poplimento	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
32F*: Rock outcrop.												
Berks------------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
33D, 33F---------- Sequoia	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High-----	Moderate.
34*. Slickens												
35B, 35C---------- Timberville Variant	B	Frequent----	Very brief	May-Jun	>3.0	Apparent	Feb-May	>60	---	Moderate	Low------	Low.
35C--------------- Timberville Variant	B	Occasional	Very brief	May-Jun	>3.0	Apparent	Feb-May	>60	---	Moderate	Low------	Low.

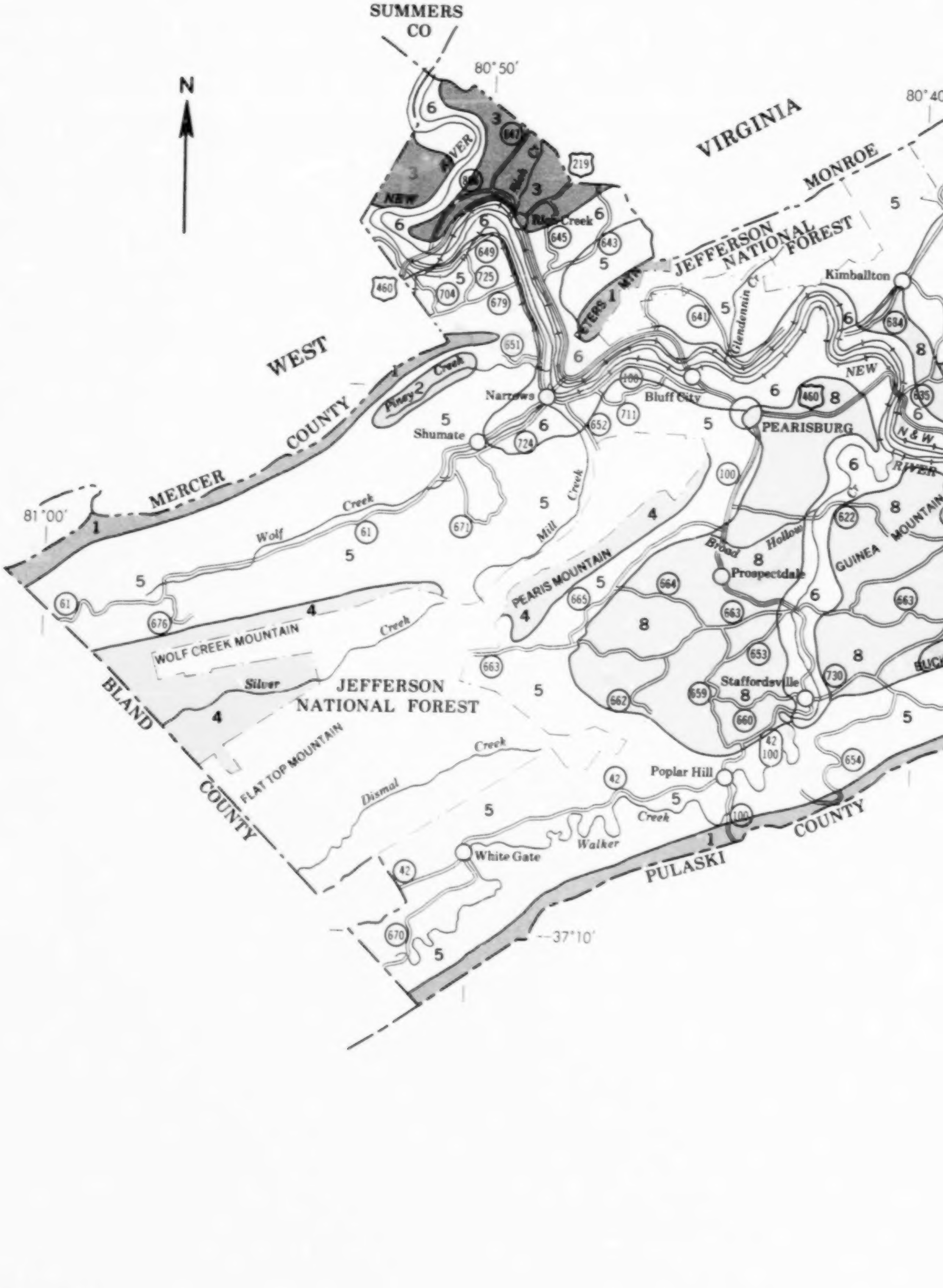
* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

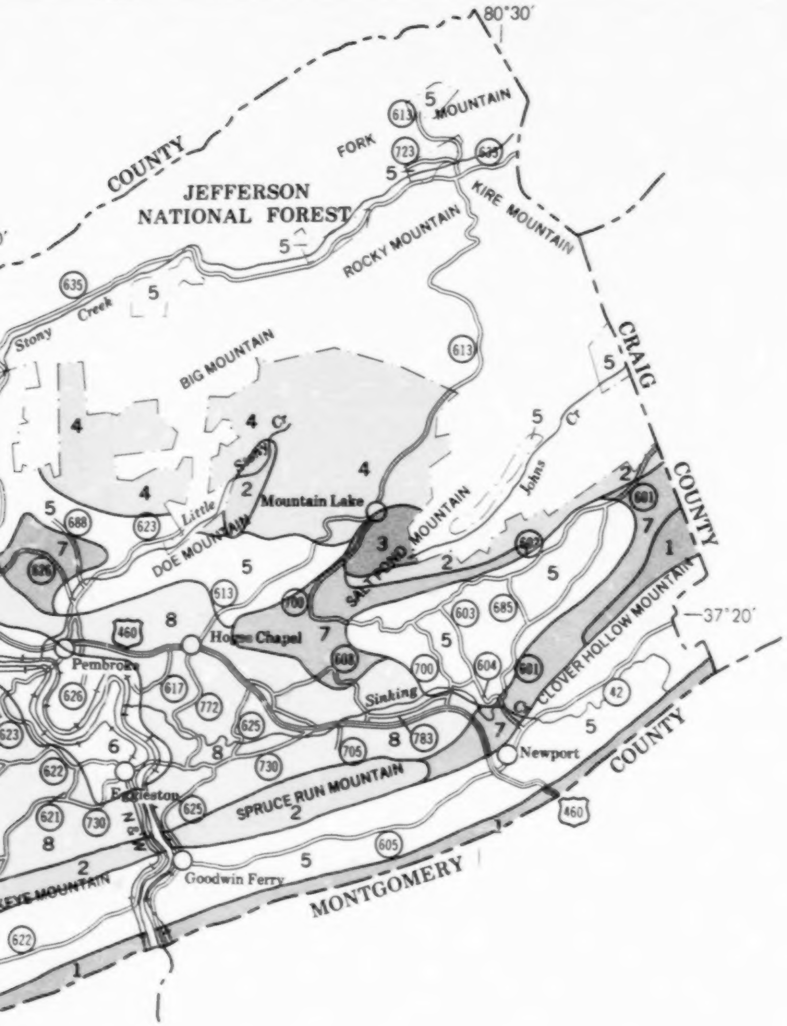
Soil name	Family or higher taxonomic class
Allegheny	Fine-loamy, mixed, mesic Typic Hapludults
Bailegap	Fine-loamy, siliceous, mesic Typic Hapludults
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Braddock	Clayey, mixed, mesic Typic Hapludults
Carbo	Very-fine, mixed, mesic Typic Hapludalfs
Chagrin	Fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Chagrin Variant	Sandy, mixed, mesic Cumulic Haplumbrepts
Chavies Variant	Coarse-loamy, mixed, mesic Typic Hapludalfs
Cotaco	Fine-loamy, mixed, mesic Aquic Hapludults
Drall	Sandy-skeletal, siliceous, mesic Typic Udorthents
*Faywood	Fine, mixed, mesic Typic Hapludalfs
Fluvaquents	Fluvaquents
Frederick	Clayey, mixed, mesic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
*Jefferson	Fine-loamy, siliceous, mesic Typic Hapludults
Jefferson Variant	Coarse-loamy, siliceous, mesic Typic Hapludults
*Lehew	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
*Nolichucky	Fine-loamy, siliceous, mesic Typic Paleudults
Poplimento	Fine, mixed, mesic Ultic Hapludalfs
*Sequoia	Clayey, mixed, mesic Typic Hapludults
Timberville Variant	Fine-loamy, mixed, mesic Ultic Hapludalfs
Wallen	Loamy-skeletal, siliceous, mesic Typic Dystrochrepts

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

☆ U.S. GOVERNMENT PRINTING OFFICE : 1985 O - 449-330 : QL 3


SUMMERS CO
N
80°50′
80°40′
VIRGINIA
WEST
MONROE
MERCER
COUNTY
81°00′
BLAND
COUNTY
PULASKI
COUNTY
JEFFERSON NATIONAL FOREST
NEW RIVER
Rich Creek
Narrows
Shumate
Bluff City
PEARISBURG
Kimballton
Prospectdale
Staffordsville
Poplar Hill
White Gate
PETERS MTN
Piney Creek
Wolf Creek
Mill Creek
Walker Creek
Dismal Creek
Silver Creek
Broad Hollow
Clendennin Cr
WOLF CREEK MOUNTAIN
FLAT TOP MOUNTAIN
PEARIS MOUNTAIN
GUINEA MOUNTAIN
N & W
37°10′
1
2
3
4
5
6
8
460
219
61
42
100
641
643
645
647
649
651
652
653
654
659
660
662
663
664
665
670
671
676
679
684
704
711
724
725
730

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.


80°30′
37°20′
JEFFERSON NATIONAL FOREST
COUNTY
CRAIG COUNTY
MONTGOMERY COUNTY
FORK MOUNTAIN
ROCKY MOUNTAIN
KIRE MOUNTAIN
BIG MOUNTAIN
DOE MOUNTAIN
SALT POND MOUNTAIN
CLOVER HOLLOW MOUNTAIN
SPRUCE RUN MOUNTAIN
Stony Creek
Little Stony Cr
Johns Cr
Sinking Cr
Mountain Lake
Pembroke
Hoges Chapel
Eggleston
Newport
Goodwin Ferry
613
723
635
688
623
626
700
602
603
685
604
601
608
617
772
625
622
730
705
783
621
605
42
460
1
2
3
4
5
6
7
8

SOIL LEGEND

SOILS ON MOUNTAINS AND MOUNTAIN FOOTSLOPES FORMED IN RESIDUUM OF SHALE AND SANDSTONE OR COLLUVIAL MATERIAL FROM SHALE OR SANDSTONE

1	GILPIN-LEHEW-WALLEN: strongly sloping to very steep, somewhat excessively and well drained, moderately deep, loamy soils; on mountains and high ridges
2	JEFFERSON VARIANT-DRALL: moderately steep to very steep, deep, well drained and excessively drained, loamy and sandy soils; on sidesloopes and ridges
3	GILPIN-BERKS: sloping to very steep, well drained, moderately deep, loamy soils; on ridges and sideslopes
4	LILY-BAILEGAP-JEFFERSON: sloping to very steep, well drained, moderately deep to deep loamy soils; on ridgetops, sideslopes and footslopes

SOILS ON MOUNTAIN FOOTSLOPES FORMED IN COLLUVIUM, HIGH TERRACE MATERIAL, OR RESIDUUM WEATHERED FROM LIMESTONE

5	NOLICHUCKY-FREDERICK-CARBO: sloping to very steep, well drained, deep and moderately deep soils having either a loamy or clayey subsoil
6	BRADDOCK: gently sloping to steep, well drained deep soils having a clayey subsoil

SOILS ON VALLEY UPLANDS FORMED IN RESIDUUM WEATHERED FROM SHALE OR LIMESTONE

7	FAYWOOD-POPLIMENTO-SEQUOIA: moderately steep to very steep, well drained, moderately deep and deep soils that have a clayey subsoil
8	FREDERICK-CARBO: sloping to very steep, well drained, deep and moderately deep soils having a clayey subsoil

COMPILED 1983

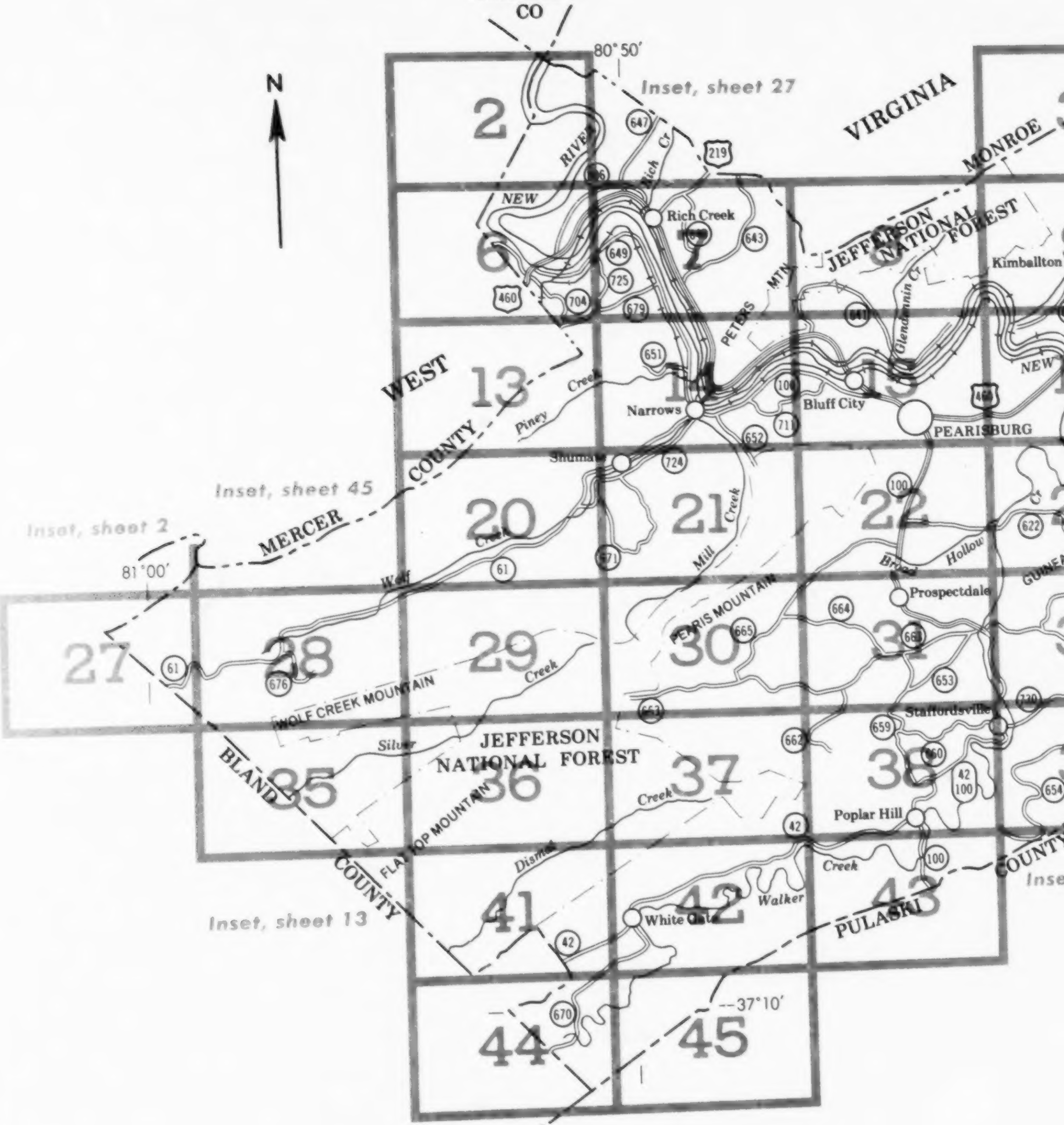
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY AND U.S. FOREST SERVICE

GENERAL SOIL MAP

GILES COUNTY, VIRGINIA, SOUTHERN AND CENTRAL PART

Scale 1:190,080

1 0 1 2 3 Miles
1 0 3 6 Km


SUMMERS CO
80°50′
N
Inset, sheet 27
VIRGINIA
MONROE
JEFFERSON NATIONAL FOREST
Kimballton
NEW RIVER
Rich Cr
Rich Creek
PETERS MTN
Glendennin Cr
WEST
MERCER COUNTY
Inset, sheet 45
Inset, sheet 2
81°00′
Piney Creek
Narrows
Bluff City
PEARISBURG
Shumate
Wolf Creek
Mill Creek
Broad Hollow
Prospectdale
PEARIS MOUNTAIN
WOLF CREEK MOUNTAIN
Creek
Staffordsville
Silver
JEFFERSON NATIONAL FOREST
BLAND COUNTY
FLAT TOP MOUNTAIN
Creek
Poplar Hill
Dismal
Walker
Creek
PULASKI COUNTY
Inset, sheet 13
White Gate
37°10′
2
6
7
8
13
14
15
20
21
22
27
28
29
30
31
35
36
37
38
41
42
43
44
45
647
219
649
725
704
679
460
643
651
100
711
652
724
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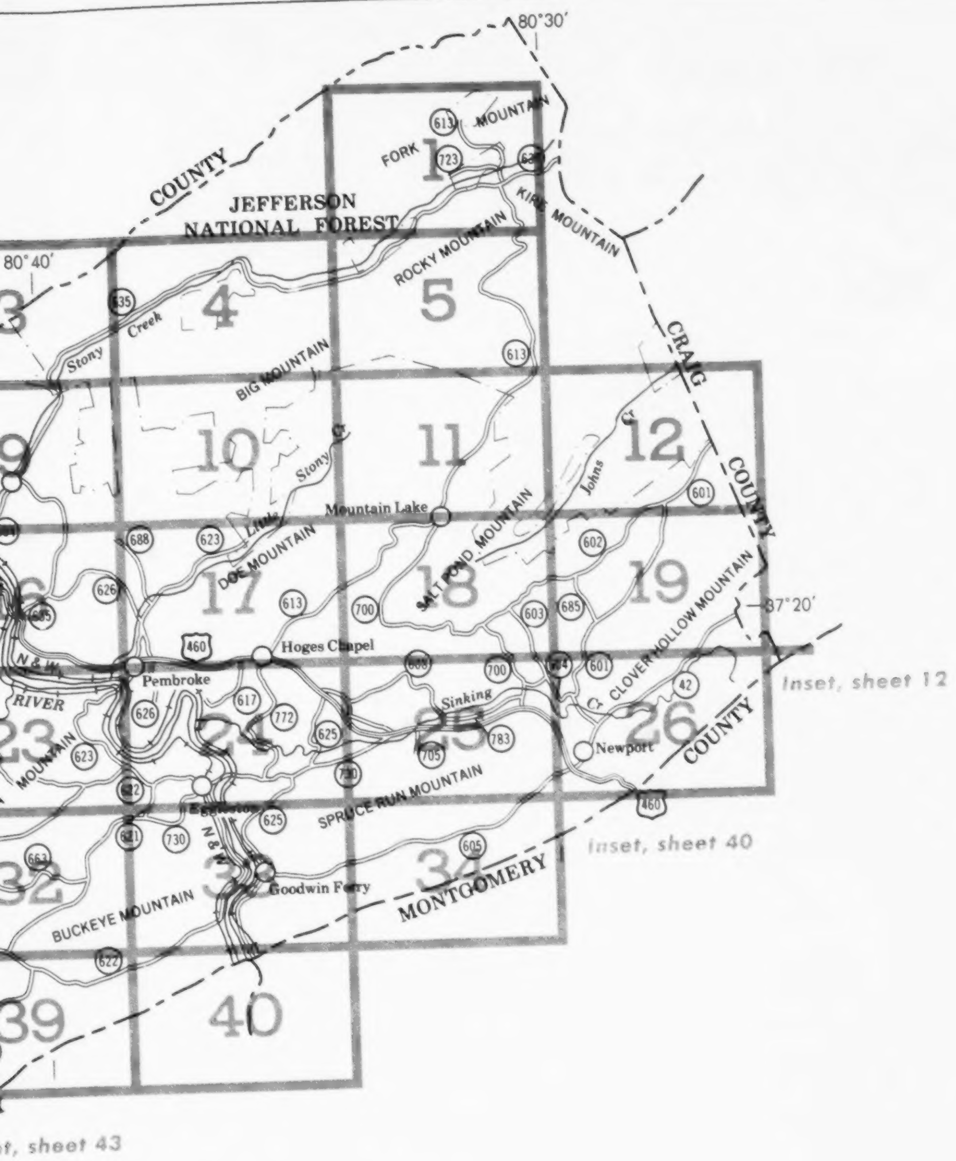
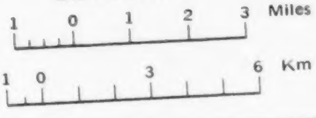
571
61
664
665
681
653
659
660
662
720
42
654
670


80°30′
80°40′
37°20′
COUNTY
JEFFERSON NATIONAL FOREST
FORK MOUNTAIN
KIRK MOUNTAIN
ROCKY MOUNTAIN
CRAIG COUNTY
BIG MOUNTAIN
Stony Creek
Little Stony Cr.
Johns Cr.
Mountain Lake
DOE MOUNTAIN
SALT POND MOUNTAIN
CLOVER HOLLOW MOUNTAIN
Hoges Chapel
Pembroke
N & W
RIVER
MOUNTAIN
Sinking Cr.
Newport
COUNTY
SPRUCE RUN MOUNTAIN
Eggleston
Goodwin Ferry
BUCKEYE MOUNTAIN
MONTGOMERY
Inset, sheet 12
Inset, sheet 40
Inset, sheet 43
1
3
4
5
9
10
11
12
16
17
18
19
23
24
25
26
32
33
34
39
40
613
723
635
623
688
626
685
460
700
603
602
601
42
608
617
772
625
783
705
622
621
730
663
605

INDEX TO MAP SHEETS

GILES COUNTY, VIRGINIA, SOUTHERN AND CENTRAL PART

Scale 1:190,080


1 0 1 2 3 Miles
1 0 3 6 Km

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GILES COUNTY, VIRGIN

SOIL LEGEND

Publication symbols consist of numbers or a combination of numbers and letters (e.g. 8, 16D, or 31E). The initial numbers represent the kind of soil. A capital letter of B, C, D, E or F following these numbers indicates the class slope. Symbols without a slope letter are for nearly level soils, soils named for higher categories, or for miscellaneous areas.

SYMBOL	NAME
1B	Allegheny loam, 2 to 7 percent slopes
1C	Allegheny loam, 7 to 15 percent slopes
2D	Berks shaly silt loam, 10 to 30 percent slopes
2F	Berks shaly silt loam, 30 to 65 percent slopes
3F	Berks very stony silt loam, 30 to 65 percent slopes
4B	Braddock sandy loam, 2 to 7 percent slopes
4C	Braddock sandy loam, 7 to 15 percent slopes
4D	Braddock sandy loam, 15 to 25 percent slopes
4E	Braddock sandy loam, 25 to 35 percent slopes
5C	Carbo silty clay loam, very rocky, 2 to 15 percent slopes
5D	Carbo silty clay loam, very rocky, 15 to 45 percent slopes
6F	Carbo-Rock outcrop complex, 25 to 65 percent slopes
7	Chagrin silt loam
8	Chagrin Variant loamy sand
9	Chavies Variant sandy loam
10B	Cotaco loam, 2 to 7 percent slopes
10C	Cotaco loam, 7 to 15 percent slopes
11D	Faywood silt loam, 10 to 30 percent slopes
11F	Faywood silt loam, 30 to 65 percent slopes
12	Fluvaquents, nearly level
13B	Frederick silt loam, 2 to 7 percent slopes
13C	Frederick silt loam, 7 to 15 percent slopes
13D	Frederick silt loam, 15 to 25 percent slopes
13E	Frederick silt loam, 25 to 35 percent slopes
14B	Frederick cherty silt loam, 2 to 7 percent slopes
14C	Frederick cherty silt loam, 7 to 15 percent slopes
14D	Frederick cherty silt loam, 15 to 25 percent slopes
14E	Frederick cherty silt loam, 25 to 35 percent slopes
15C	Frederick very stony silt loam, 7 to 15 percent slopes
15D	Frederick very stony silt loam, 15 to 25 percent slopes
15E	Frederick very stony silt loam, 25 to 35 percent slopes
16D	Frederick-Rock outcrop complex, 10 to 30 percent slopes
16F	Frederick-Rock outcrop complex, 30 to 60 percent slopes
17C	Gilpin silt loam, 7 to 15 percent slopes
17D	Gilpin silt loam, 15 to 30 percent slopes
17F	Gilpin silt loam, 30 to 65 percent slopes
18D	Gilpin very stony silt loam, 10 to 30 percent slopes
18F	Gilpin very stony silt loam, 30 to 65 percent slopes
19C	Jefferson loam, 0 to 15 percent slopes
20C	Jefferson very stony loam, 0 to 15 percent slopes
20E	Jefferson very stony loam, 15 to 35 percent slopes
21C	Jefferson extremely stony loam, 0 to 15 percent slopes
21E	Jefferson extremely stony loam, 15 to 35 percent slopes
21F	Jefferson extremely stony loam, 35 to 65 percent slopes
22D	Jefferson Variant and Drall soils, very stony, 10 to 30 percent slopes
22F	Jefferson Variant and Drall soils, very stony, 30 to 65 percent slopes
23F	Lehew and Wallen soils, very stony, 35 to 65 percent slopes
24C	Lily gravelly sandy loam, 0 to 15 percent slopes
24D	Lily gravelly sandy loam, 15 to 35 percent slopes
25F	Lily extremely stony sandy loam, 35 to 65 percent slopes
26F	Lily gravelly sandy loam, very rocky, 35 to 65 percent slopes
27C	Lily-Bailegap complex, very stony, 2 to 15 percent slopes
27E	Lily-Bailegap complex, very stony, 15 to 35 percent slopes
27F	Lily-Bailegap complex, very stony, 35 to 65 percent slopes
28E	Lily-Bailegap complex, extremely stony, 15 to 35 percent slopes
29B	Nolichucky loam, 2 to 7 percent slopes
29C	Nolichucky loam, 7 to 15 percent slopes
29D	Nolichucky loam, 15 to 25 percent slopes
30C	Nolichucky very stony sandy loam, 7 to 15 percent slopes
30D	Nolichucky very stony sandy loam, 15 to 30 percent slopes
30F	Nolichucky very stony sandy loam, 30 to 65 percent slopes
31C	Poplimento silt loam, 7 to 15 percent slopes
31D	Poplimento silt loam, 15 to 25 percent slopes
31E	Poplimento silt loam, 25 to 35 percent slopes
32F	Rock outcrop-Berks complex, 30 to 80 percent slopes
33D	Sequoia silt loam, 10 to 30 percent slopes
33F	Sequoia silt loam, 30 to 65 percent slopes
34	Slickens, nearly level
35B	Timberville Variant loam, 2 to 7 percent slopes
35C	Timberville Variant loam, 7 to 15 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label) Hedley Airstrip

- Small airport, airfield, park, oilfield, cemetery, or flood pool FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate 21
- Federal 173
- State 79
- County, farm or ranch 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small water

PITS w

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) Indian Mound
- Located object (label) Tower
- Tank (label) Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial water w
- Intermittent int i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS 6F 20C

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

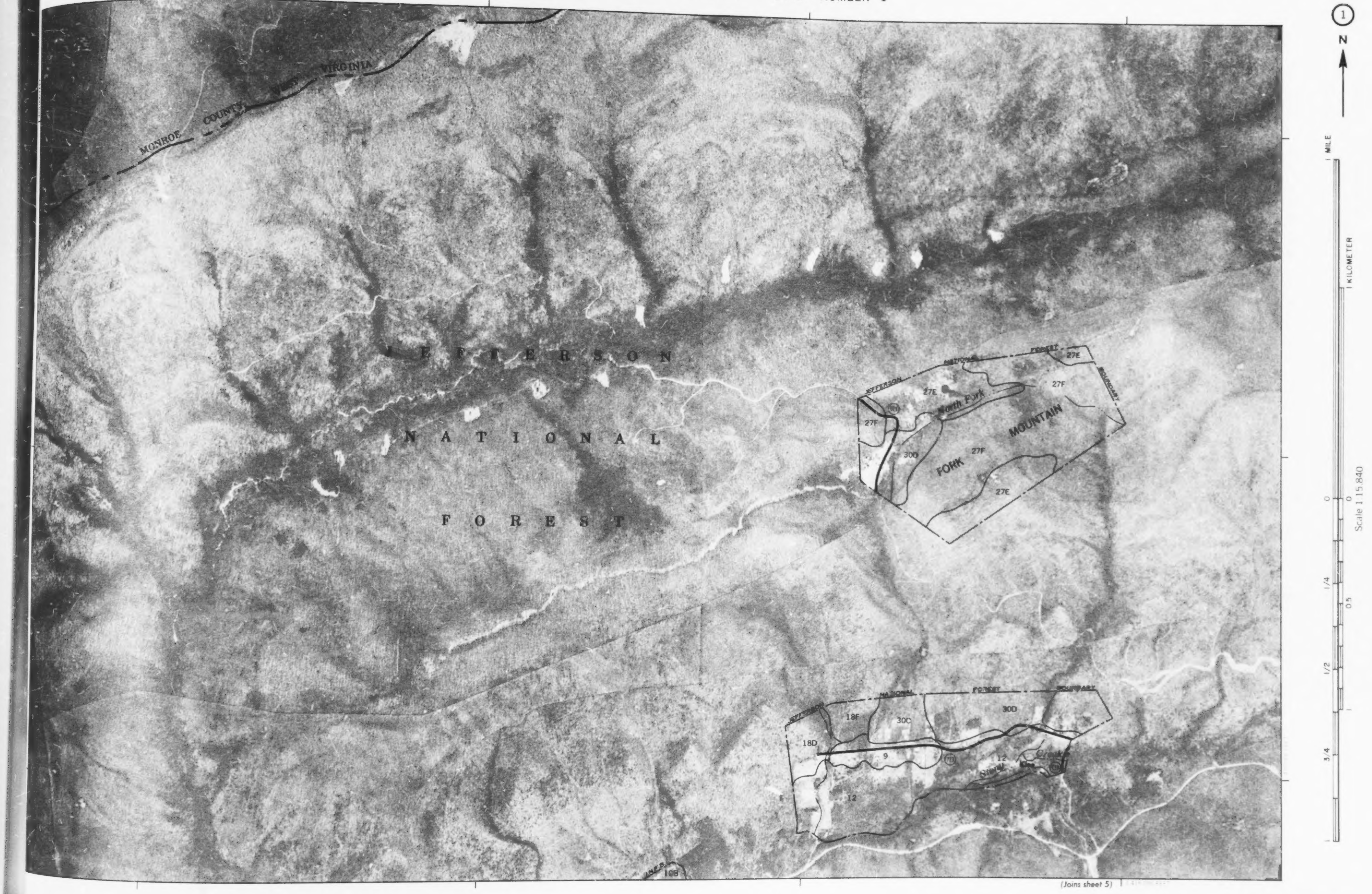
DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) S

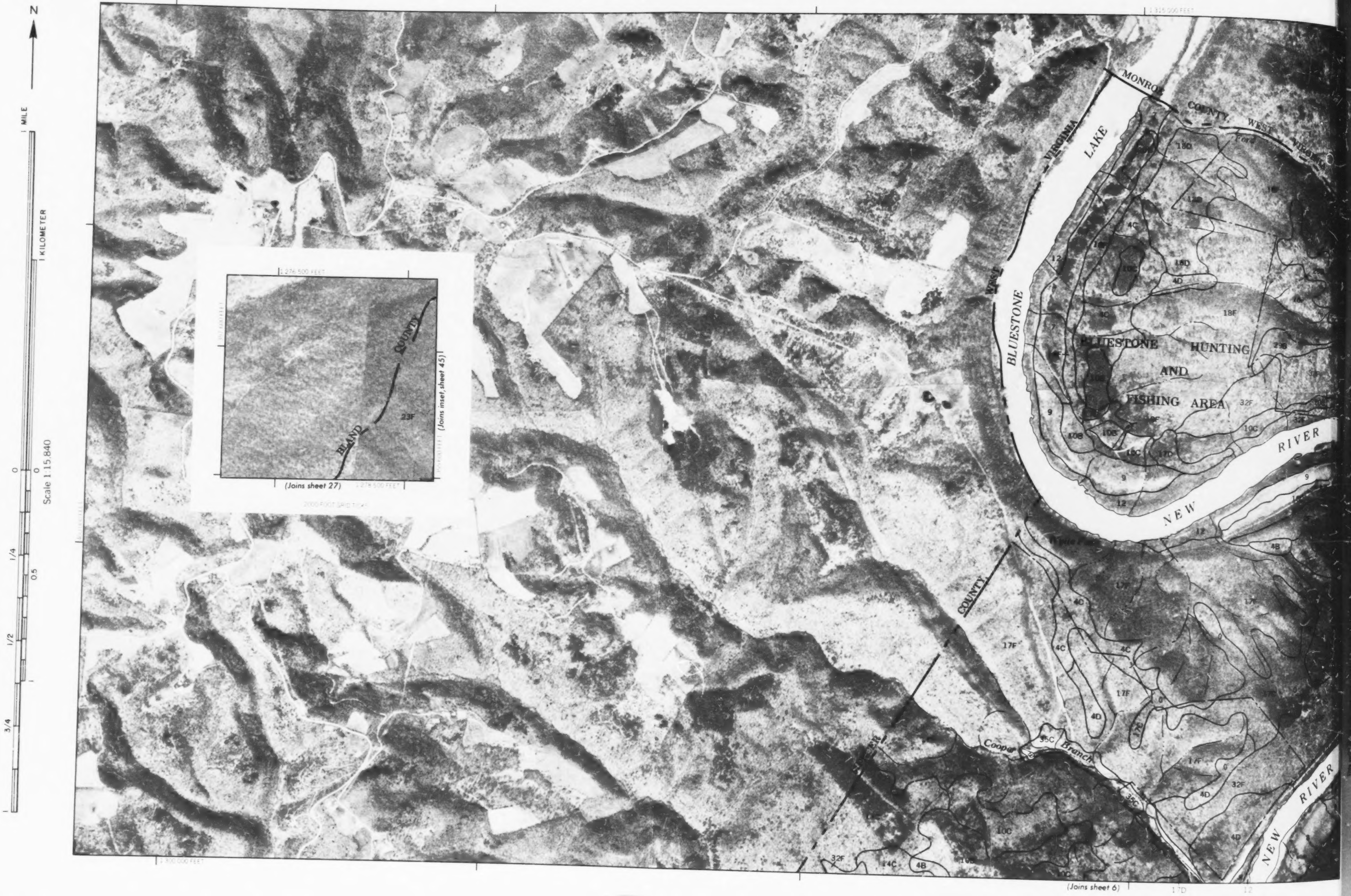
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps (industrial)
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Karst area (3-5 acres)
- Disturbed soil (3-5 acres)
- Madeland (3-5 acres)

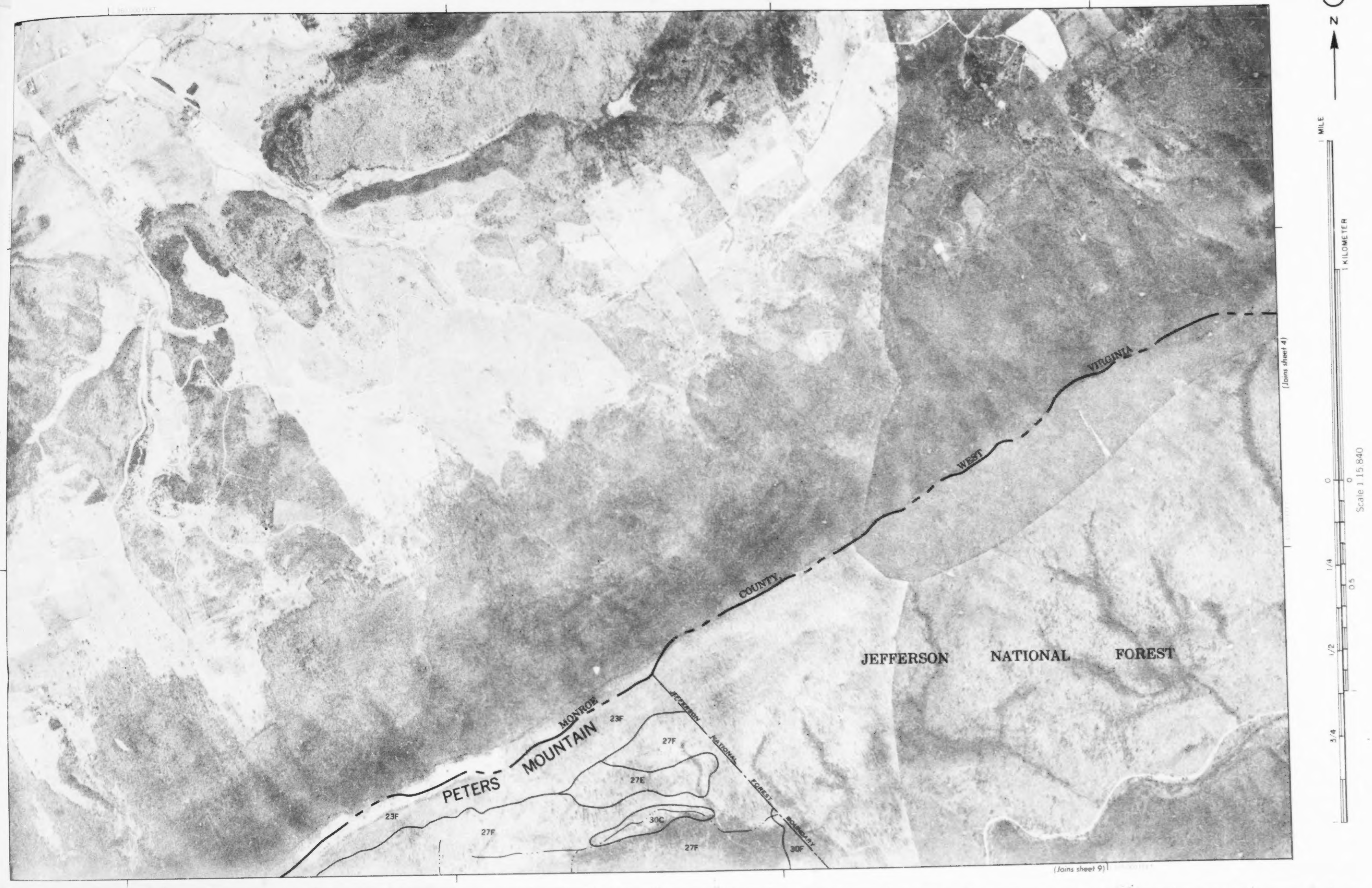
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 1


①
N
MONROE COUNTY WEST VIRGINIA
JEFFERSON
NATIONAL
FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
27E
27F
North Fork
FORK MOUNTAIN
30D
18F
30C
18D
9
12
Stony Creek
10B
(Joins sheet 5)
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0
0.5
1
Scale 1:15 840

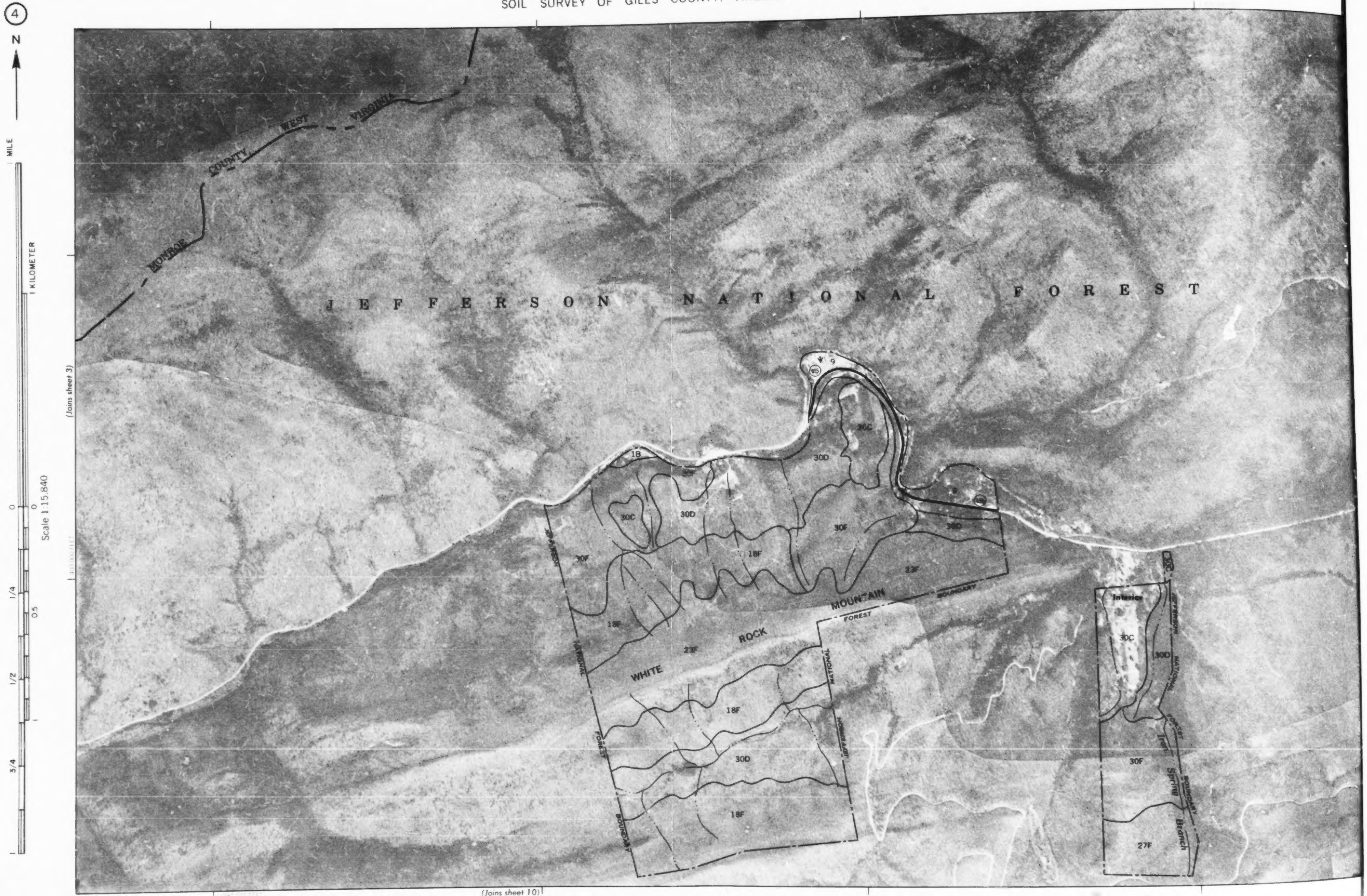
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 2


N
MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
1 276 500 FEET
BLAND
COUNTY
23F
(Joins inset, sheet 45)
(Joins sheet 27)
2000 FOOT GRID TICK
1 300 000 FEET
1 315 000 FEET
MONROE
COUNTY, WEST VIRGINIA
WEST VIRGINIA
COUNTY
BLUESTONE LAKE
BLUESTONE HUNTING AND FISHING AREA
NEW RIVER
NEW RIVER
Cooper Branch
Ford
18D
18F
4C
4D
4B
9
12
10B
10C
17D
17F
32F
35C
14C
23B
0
(Joins sheet 6)
17D
12

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 3

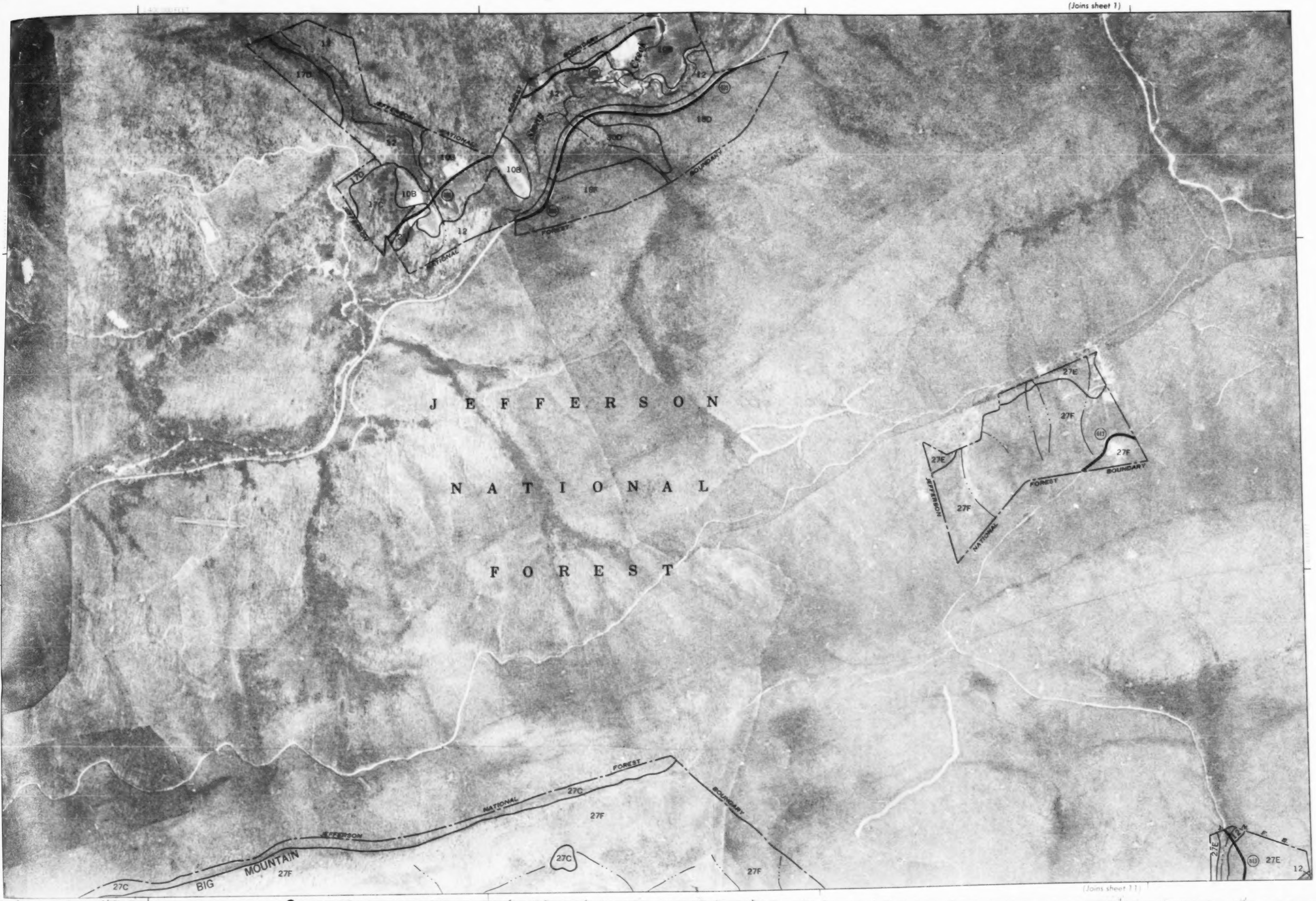

③
N
PETERS MOUNTAIN
MONROE COUNTY WEST VIRGINIA
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
23F
27F
27E
30C
30F
(Joins sheet 4)
(Joins sheet 9)
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 4


④
N
MILE
KILOMETER
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 3)
(Joins sheet 10)
MONROE COUNTY WEST VIRGINIA
JEFFERSON NATIONAL FOREST
WHITE ROCK MOUNTAIN
JEFFERSON NATIONAL FOREST BOUNDARY
Interior
Spring Branch
18
9
30C
30D
30F
18F
23F
27F

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 5

(Joins sheet 1)

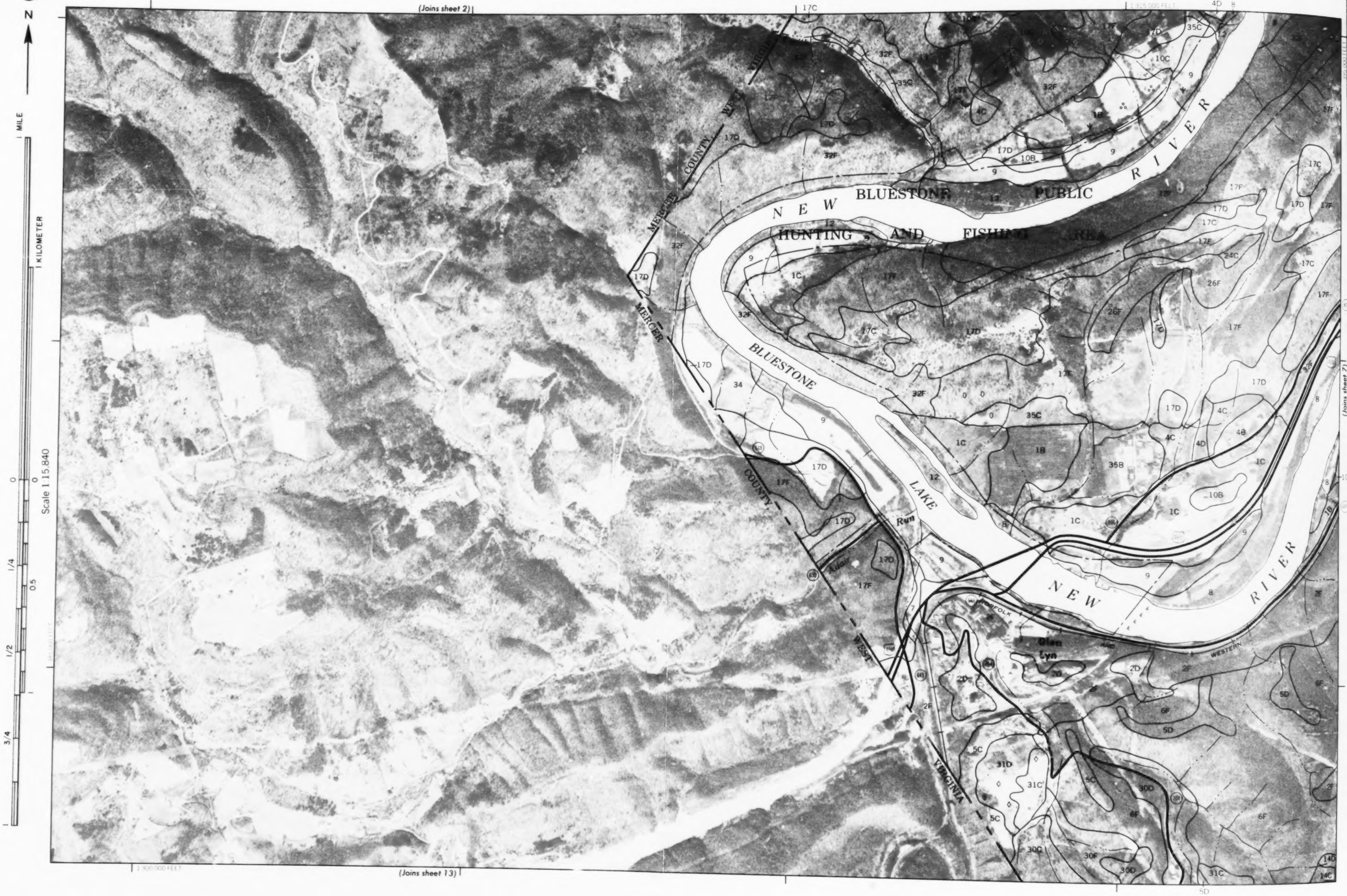


12
17D
JEFFERSON
NATIONAL
12
10B
17D
27C
10B
12
NATIONAL
FOREST
BOUNDARY
Creek
12
10B
30D
18D
18F
FOREST
BOUNDARY
JEFFERSON
NATIONAL
FOREST
27E
27F
27E
27F
JEFFERSON
27F
NATIONAL
FOREST
BOUNDARY
FOREST
27C
NATIONAL
27F
JEFFERSON
BOUNDARY
BIG
MOUNTAIN
27C
27F
27C
27F
27E
27E
12
1 MILE

(Joins sheet 4)

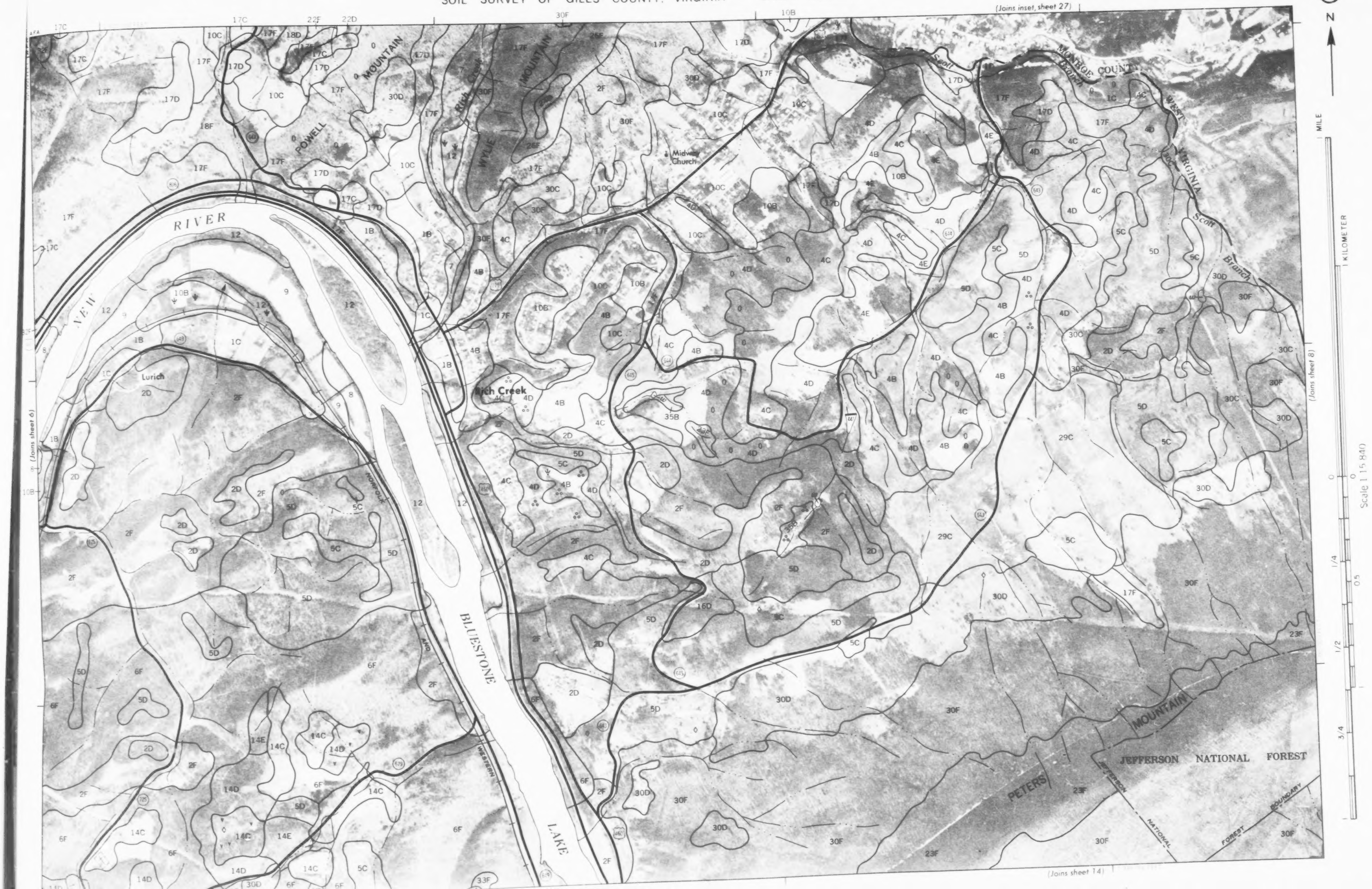
(Joins sheet 11)

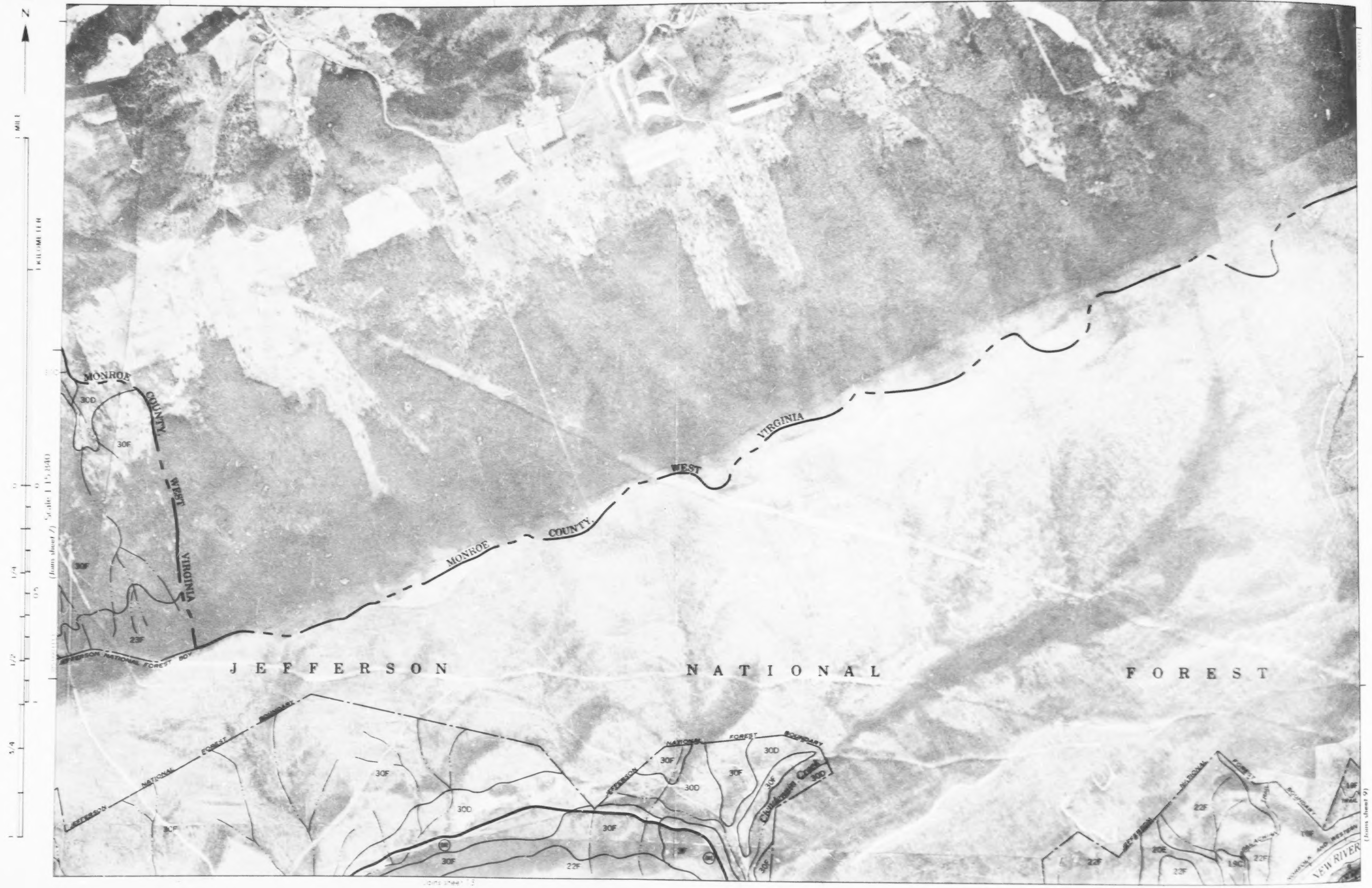
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 6


N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
(Joins sheet 2)
(Joins sheet 13)
(Joins sheet 7)
1 300 000 FEET
1 315 000 FEET
NEW BLUESTONE PUBLIC HUNTING AND FISHING AREA
NEW RIVER
BLUESTONE LAKE
NEW RIVER
MERCER COUNTY
WEST VIRGINIA
MERCER COUNTY
WEST VIRGINIA
Adair Run
Glen Lyn
NORFOLK AND WESTERN
17C
17D
17F
32F
35C
10C
10B
9
18
12
4C
1C
26F
24C
34
0
35B
1B
4D
4B
8
2D
2F
5D
5C
6F
31D
31C
30D
30C
30F
31C
14C
2F
1B
5D

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 7

⑦

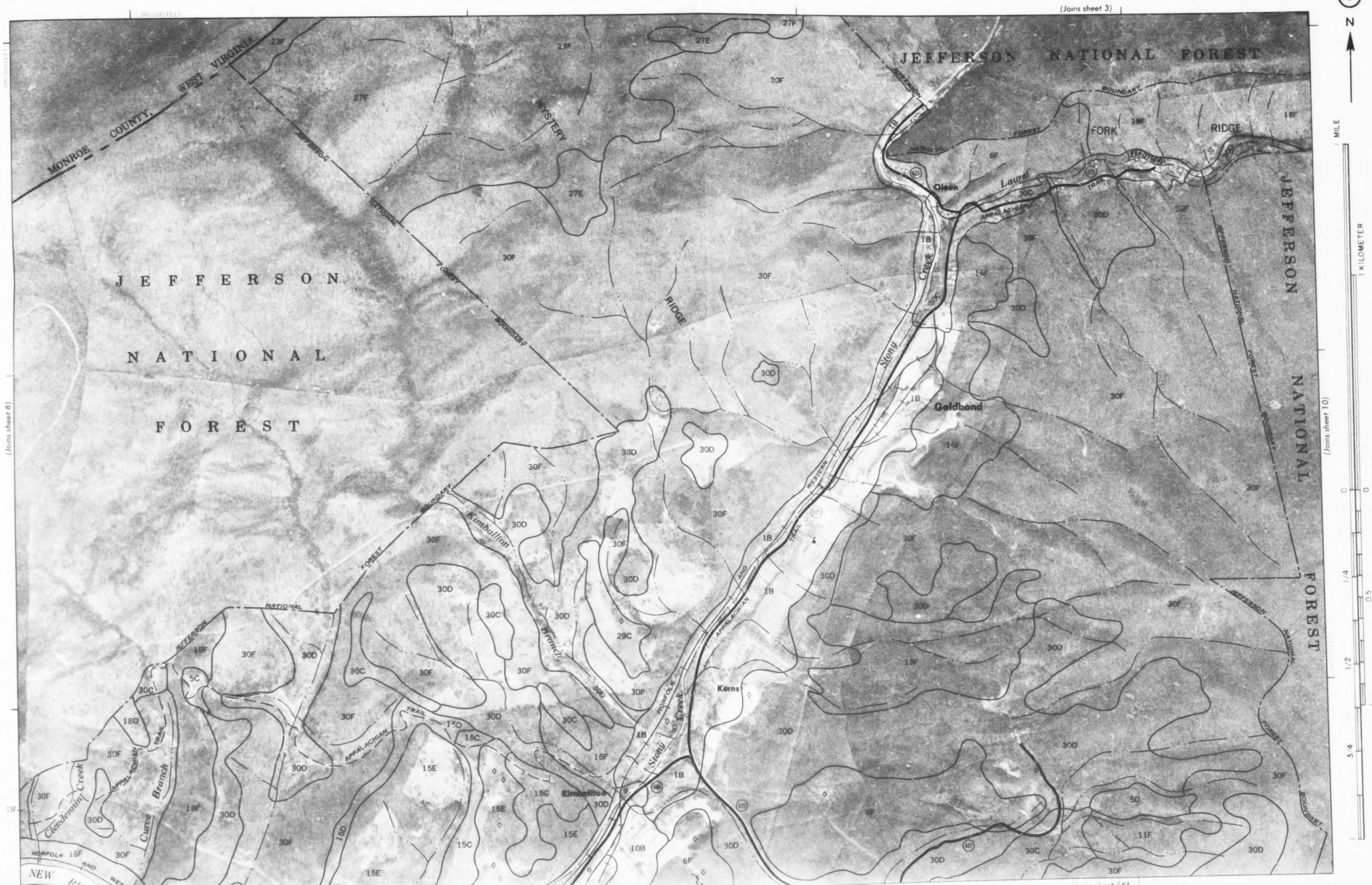

(Joins inset, sheet 27)
(Joins sheet 8)
(Joins sheet 6)
(Joins sheet 14)
N
NEW RIVER
BLUESTONE LAKE
POWELL MOUNTAIN
WYLIE MOUNTAIN
Rich Creek
Midway Church
Lurich
MONROE COUNTY
WEST VIRGINIA
Scott Branch
PETERS MOUNTAIN
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
NORFOLK AND WESTERN
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5


N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0
0.5
Scale 1:15 840
(Joins sheet 7)
MONROE COUNTY WEST VIRGINIA
MONROE COUNTY WEST VIRGINIA
30D
30F
30F
23F
JEFFERSON NATIONAL FOREST BOUNDARY
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
30F
30D
30F
30F
30F
22F
JEFFERSON NATIONAL FOREST BOUNDARY
30F
30D
30F
30D
30F
30D
Chinquapin Creek
30F
30F
JEFFERSON NATIONAL FOREST BOUNDARY
TRAIL
22F
20E
22F
22F
19C
22F
19F
19F
TRAIL
NORFOLK AND WESTERN
NEW RIVER
(Joins sheet 9)
Joins sheet 13

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 9

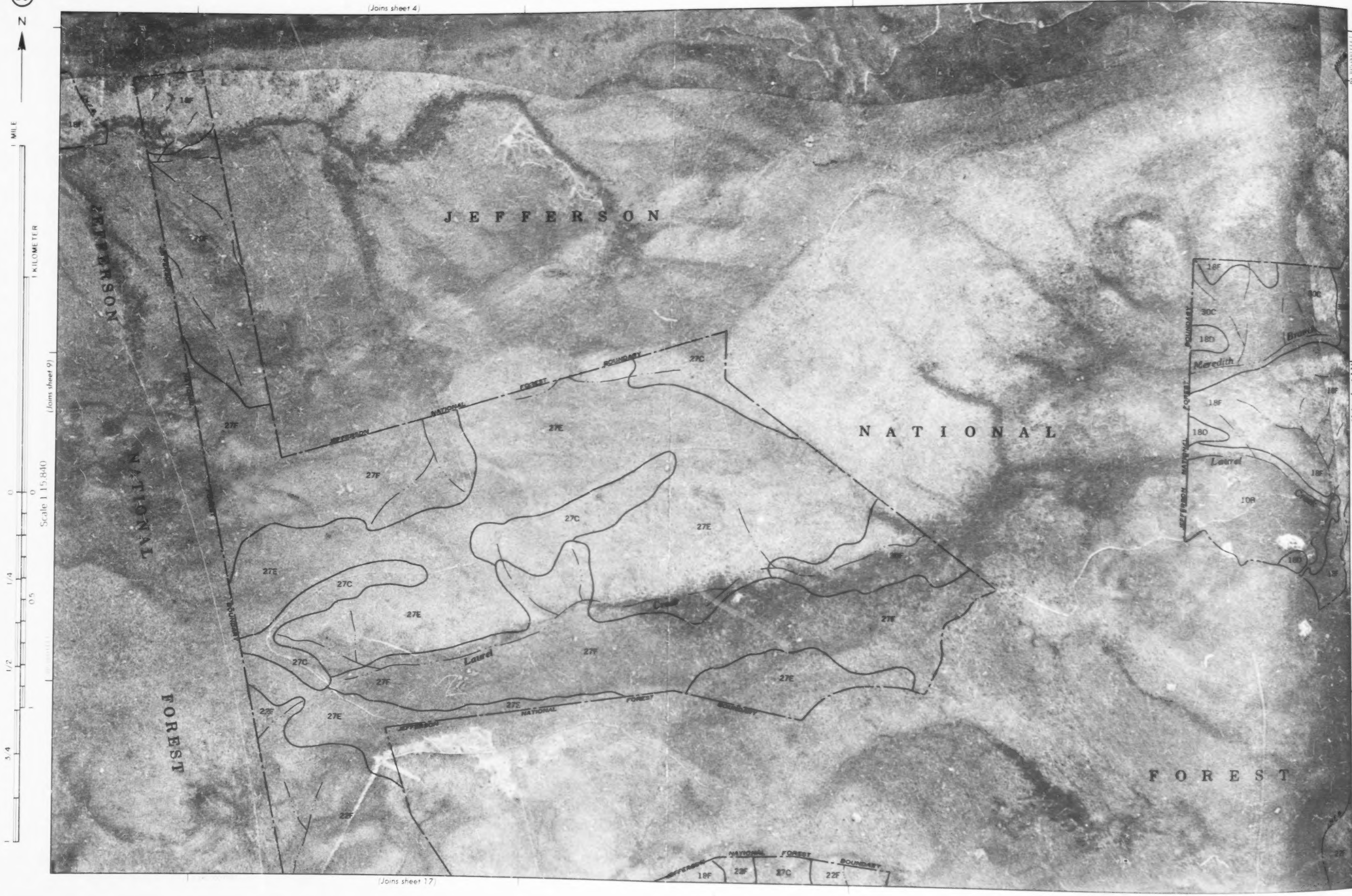
⑨

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1978 aerial photography.

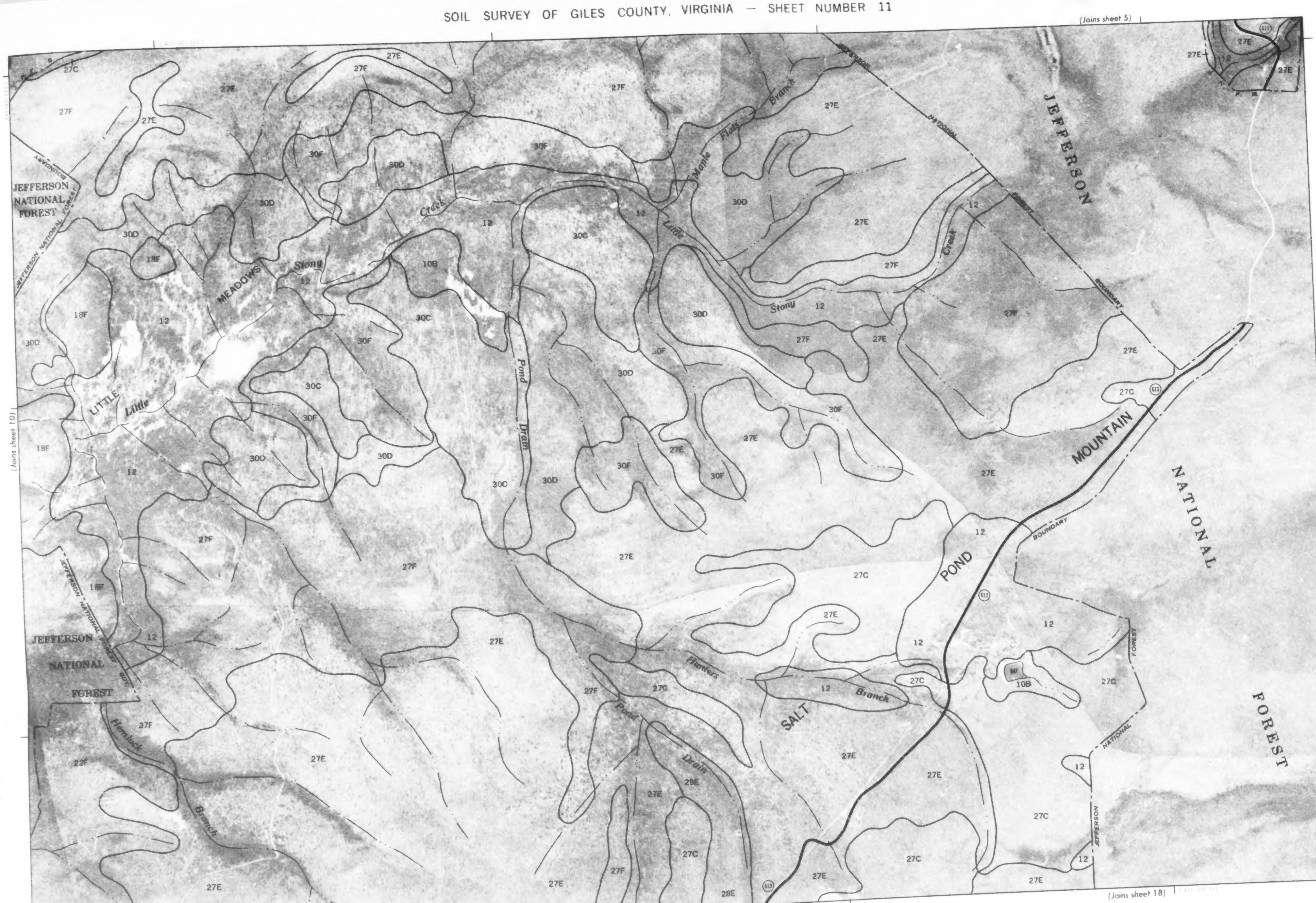

(Joins sheet 3)
(Joins sheet 8)
(Joins sheet 10)
1 360 000 FEET
395 000 FEET
N
MILE
KILOMETER
0
1/4
1/2
3/4
1
0.5
MONROE COUNTY, WEST VIRGINIA
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
MYSTERY RIDGE
FORK RIDGE
Laurel Branch
Olean
Goldbond
Kerns
Kimballton
Kimballton Branch
Stony Creek
Clendennin Creek
Curve Branch
APPALACHIAN TRAIL
NORFOLK AND WESTERN
NEW
635
23F
27F
27E
30F
30D
30C
29C
1B
6F
10B
11F
15C
15D
15E
16F
18F
18D
5C
5D

⑩

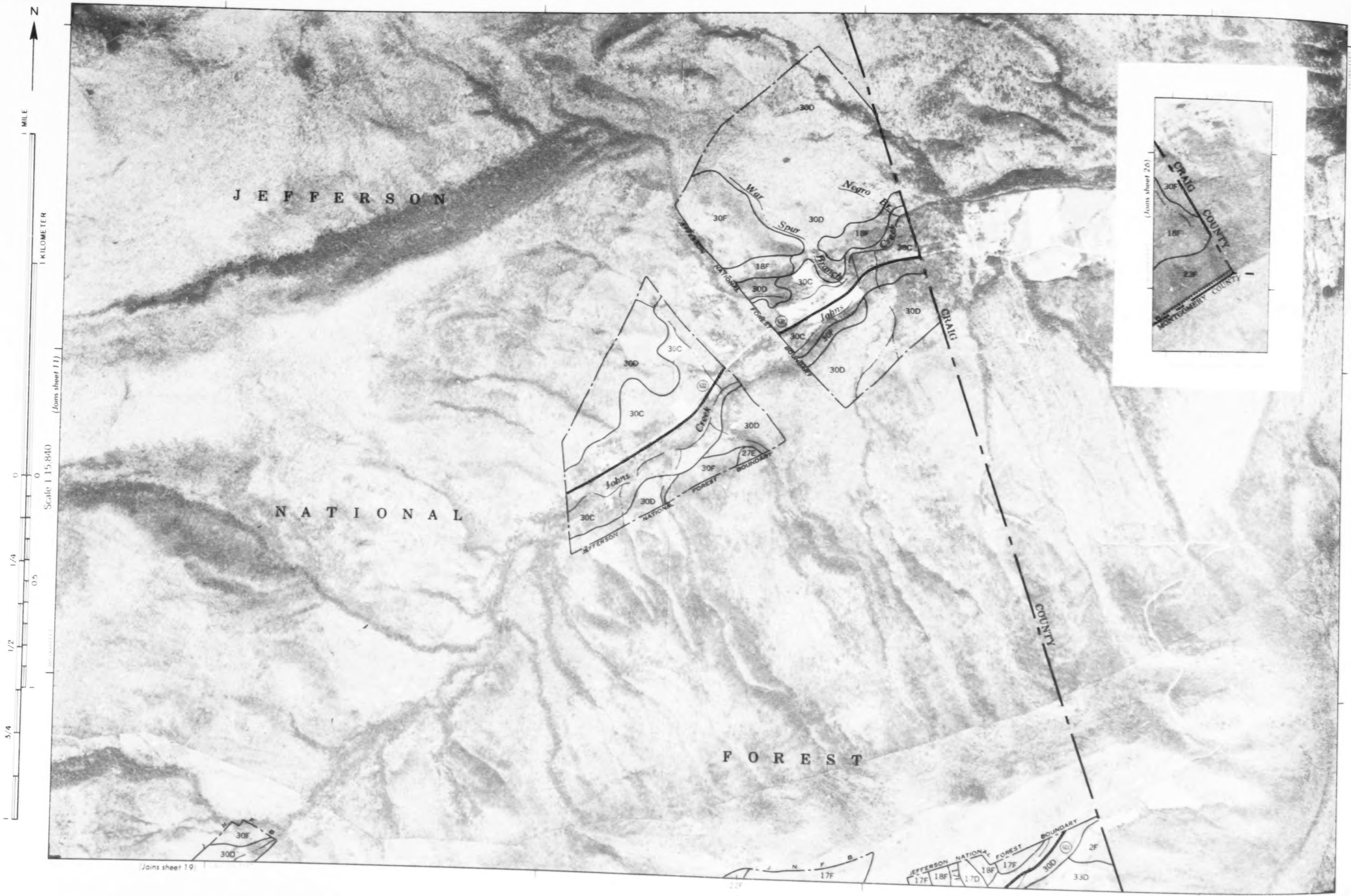
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 10


(Joins sheet 4)
(Joins sheet 9)
(Joins sheet 17)
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0
0.5
1
Scale 1:15 840
JEFFERSON
NATIONAL
FOREST
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
Laurel
Creek
Meredith
Branch
18F
18D
10B
30C
27C
27E
27F
22F

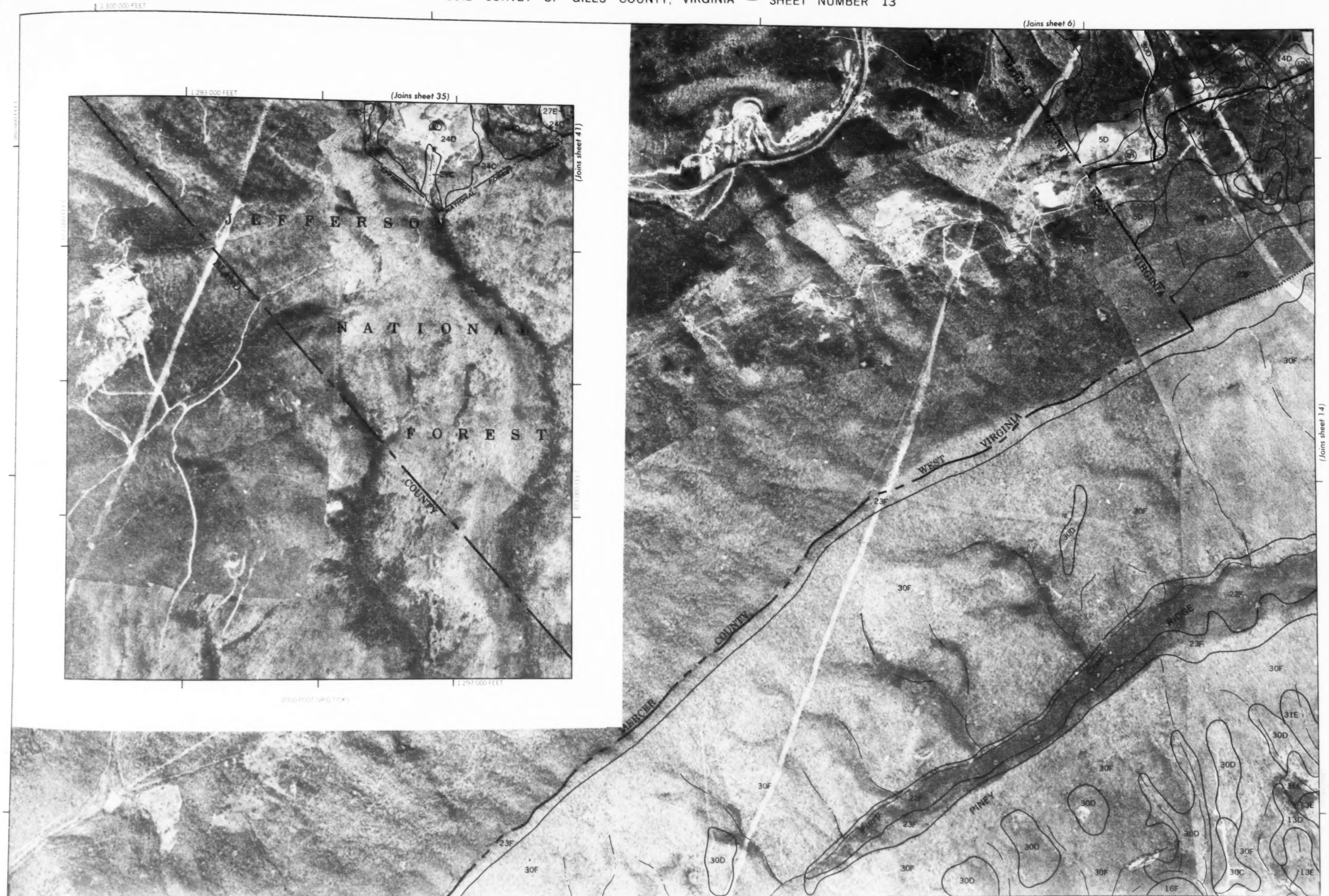
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 11


(Joins sheet 5)
(Joins sheet 10)
(Joins sheet 18)
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
JEFFERSON NATIONAL FOREST BOUNDARY
JEFFERSON
MOUNTAIN
NATIONAL
FOREST
LITTLE MEADOWS
POND
SALT
Little Stony Creek
Maple Flats Branch
Stony Creek
Pond Drain
Hunters Branch
Salt Pond Drain
Hemlock Branch
613
27C
27E
27F
30D
30F
30C
12
18F
10B
22F
28E
W

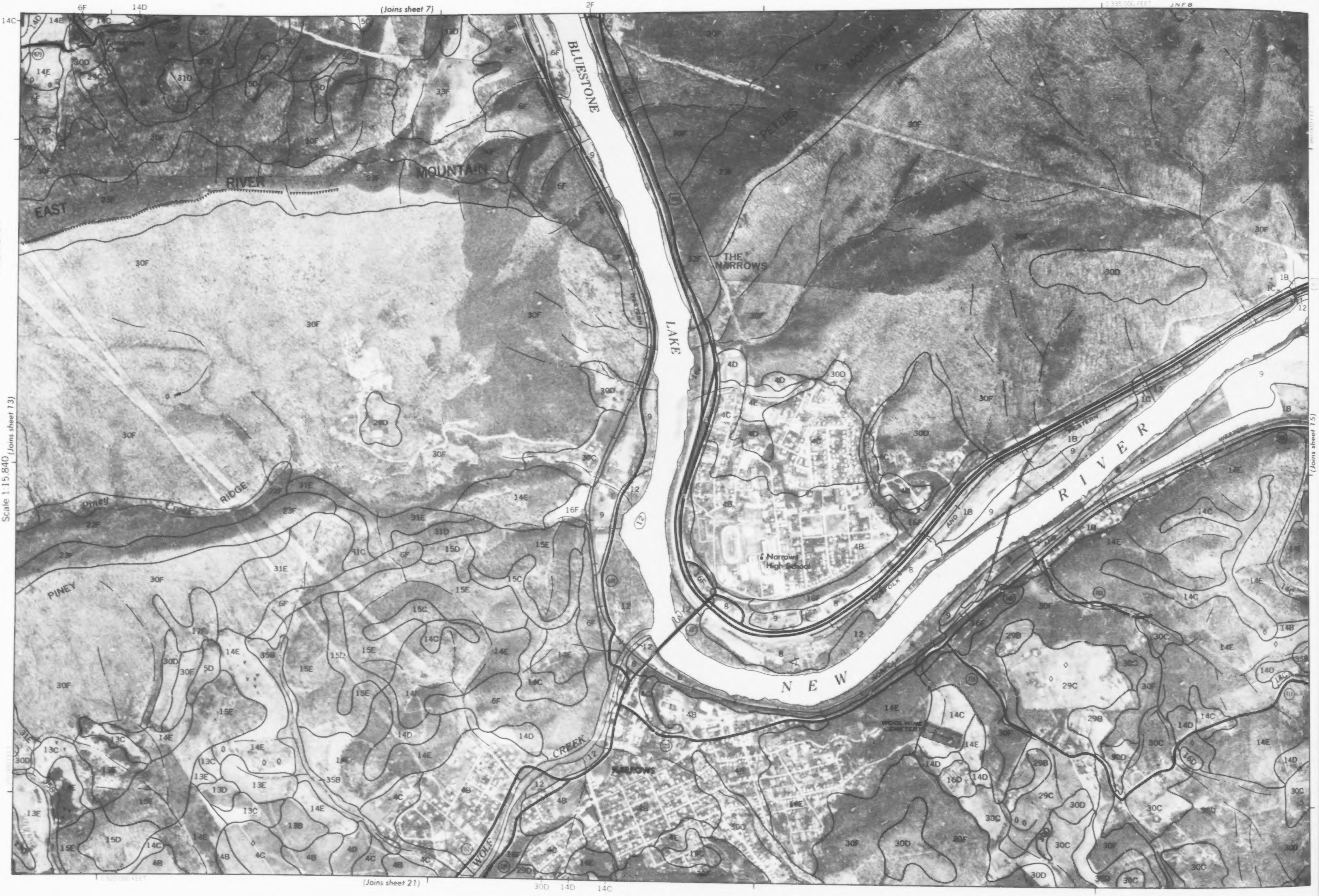
[illegible] photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


N
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
1
Scale 1:15,840
(Joins sheet 11)
JEFFERSON
NATIONAL
FOREST
CRAIG COUNTY
War Spur Branch
Negro Br.
Johns Creek
JEFFERSON NATIONAL FOREST BOUNDARY
30D
30F
18F
30C
27E
(Joins sheet 26)
CRAIG COUNTY
30F
18F
23F
MONTGOMERY COUNTY
J N F B
30F
30D
(Joins sheet 19)
17F
JEFFERSON NATIONAL FOREST BOUNDARY
17F
18F
17D
18F
17F
30D
2F
33D

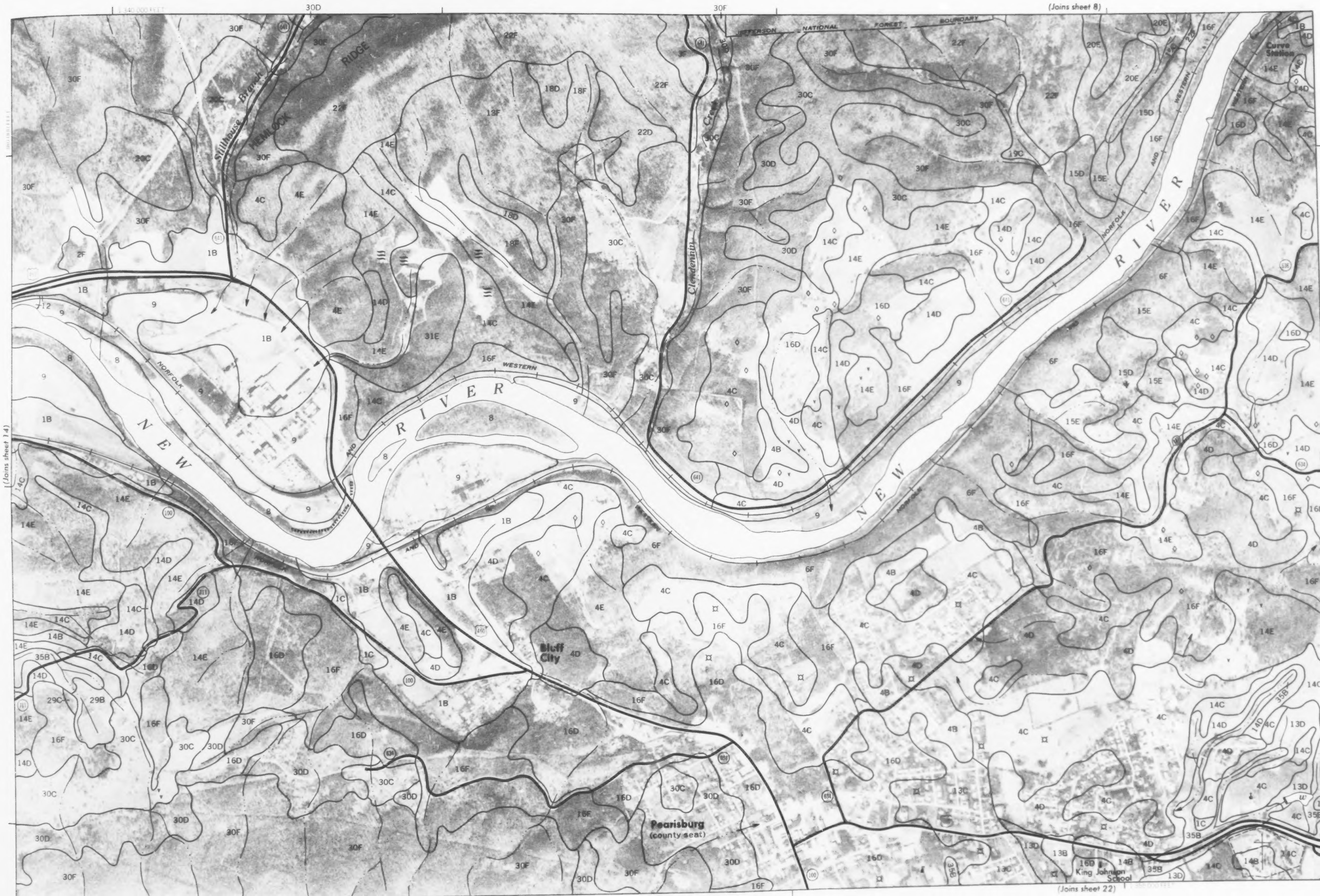
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 13

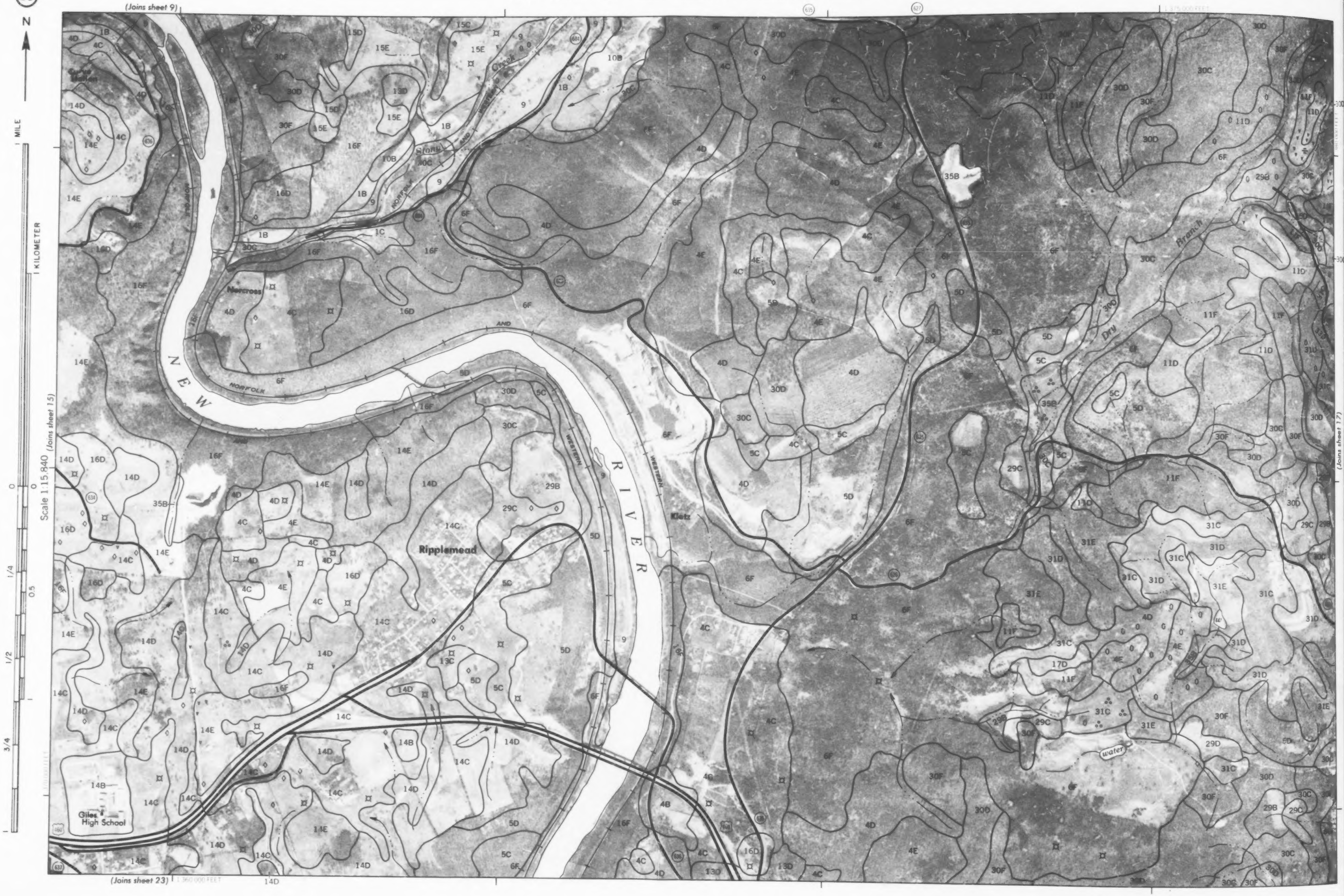

1 300 000 FEET
(Joins sheet 6)
(Joins sheet 35)
(Joins sheet 41)
(Joins sheet 14)
1 293 000 FEET
1 297 000 FEET
2000 FOOT GRID TICKS
JEFFERSON NATIONAL FOREST
NATIONAL FOREST
COUNTY
WEST VIRGINIA
MERCER COUNTY
PINEY RIDGE
24D
24C
27E
5D
14D
30F
30D
23F
31E
13D
13E
30C
16F
1 MILE
3/4
1/2
1/4
0

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 14


(Joins sheet 7)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 21)
Scale 1:15 840
1 KILOMETER
0
0.5
EAST RIVER MOUNTAIN
PETERS MOUNTAIN
BLUESTONE LAKE
THE NARROWS
PINEY RIDGE
Piney Creek
NEW RIVER
WOLF CREEK
NARROWS
Narrows High School
NORFOLK AND WESTERN
WOODLAWN CEMETERY
30F
30D
14E
14C
14D
4B
23F
6F
12
9
8

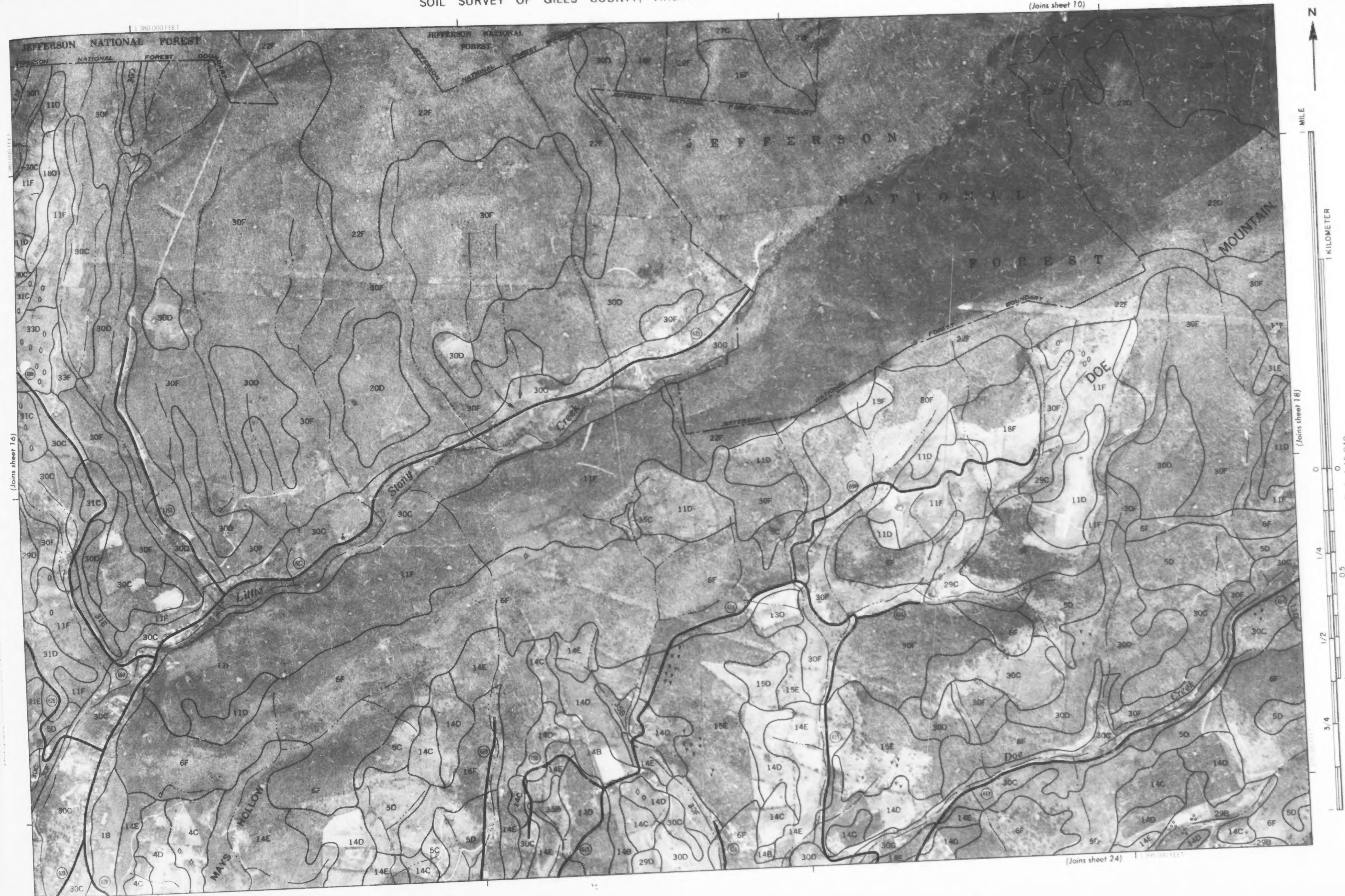
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 15


1 340 000 FEET
(Joins sheet 8)
(Joins sheet 14)
(Joins sheet 22)
JEFFERSON NATIONAL FOREST BOUNDARY
HEMLOCK RIDGE
Stillhouse Branch
Clendennin Creek
NEW RIVER
NEW RIVER
NORFOLK AND WESTERN
Curve Station
Bluff City
Pearisburg (county seat)
King Johnston School
30D
30F
1B
9
8
4C
4E
14C
14D
14E
16D
16F
30C
22F
6F
15D
15E
35B
13D


16
N
(Joins sheet 9)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 23)
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
NEW RIVER
NORFOLK AND WESTERN
Stony Creek
Norcross
Ripplemead
Kletz
Giles High School
Dry Branch
water
35B
30D
30C
30F
4C
4D
4E
5C
5D
6F
11D
11F
14B
14C
14D
14E
16D
16F
29B
29C
29D
31C
31D
31E

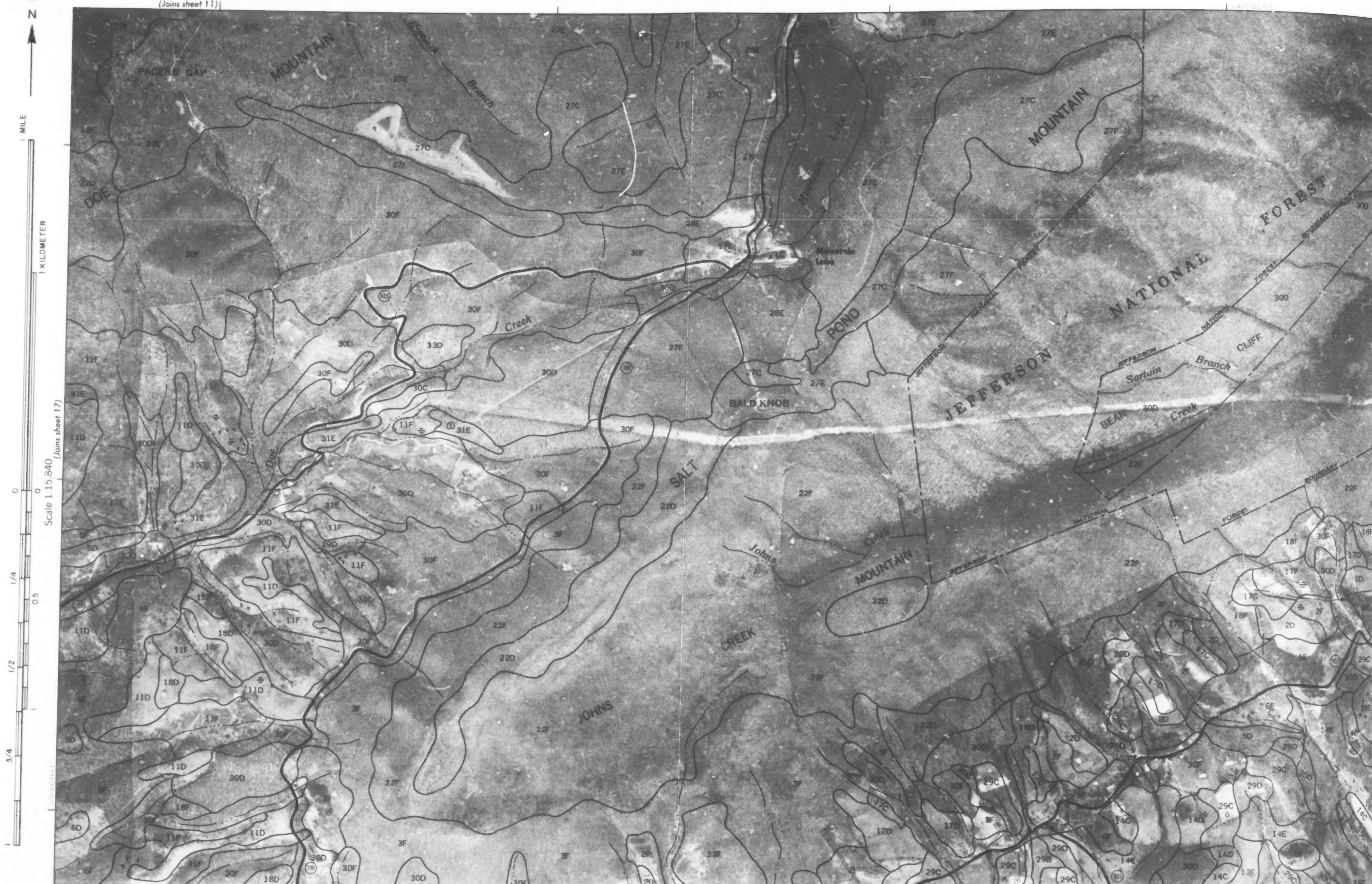
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 17


(Joins sheet 10)
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 24)
1 380 000 FEET
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
JEFFERSON NATIONAL FOREST
Little Stony Creek
DOE MOUNTAIN
Doe Creek
MAYS HOLLOW
N
MILE
KILOMETER
0
1/4
1/2
3/4
1
0
0.5
1
30F
30D
30C
22F
22D
11D
11F
6F
5D
14C
14D
14E
15D
15E
29C
29D
31C
31E
18F

⑱

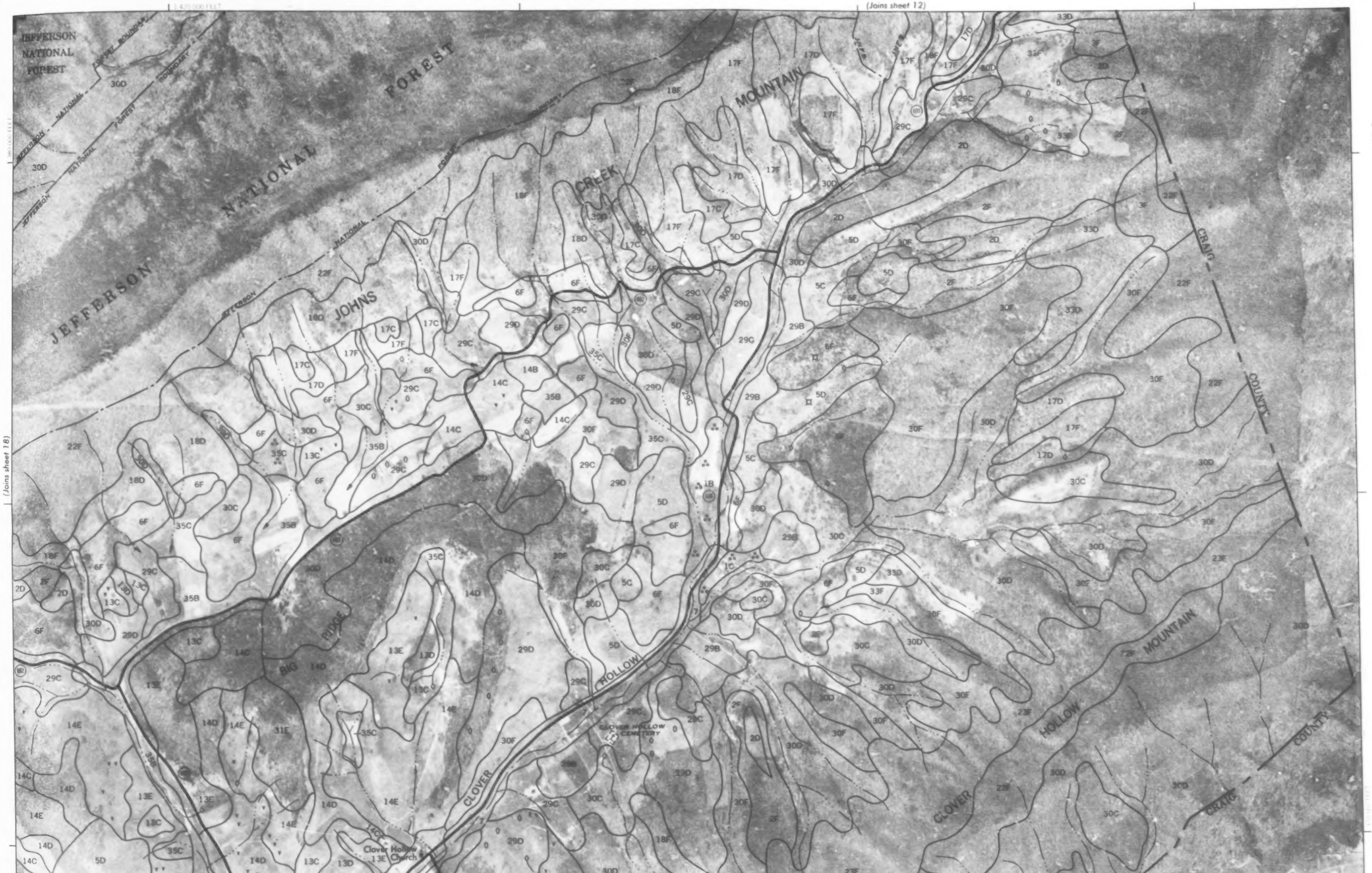
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 18


(Joins sheet 11)
(Joins sheet 17)
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
PACERS GAP
DOE
MOUNTAIN
Branch
Creek
Doe
Mountain Lake
POND
MOUNTAIN
BALD KNOB
SALT
Johns
Creek
MOUNTAIN
JOHNS
CREEK
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
CLIFF
Sartain Branch
BEAR
Creek
Johns

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 19

⑲

(Joins sheet 12)


1 430 000 FEET
380 000 FEET
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
JOHNS CREEK MOUNTAIN
BIG RIDGE
CLOVER HOLLOW
CLOVER HOLLOW MOUNTAIN
CLOVER HOLLOW CEMETERY
Clover Hollow Church
CRAIG COUNTY
(Joins sheet 18)

(Joins sheet 18)

N

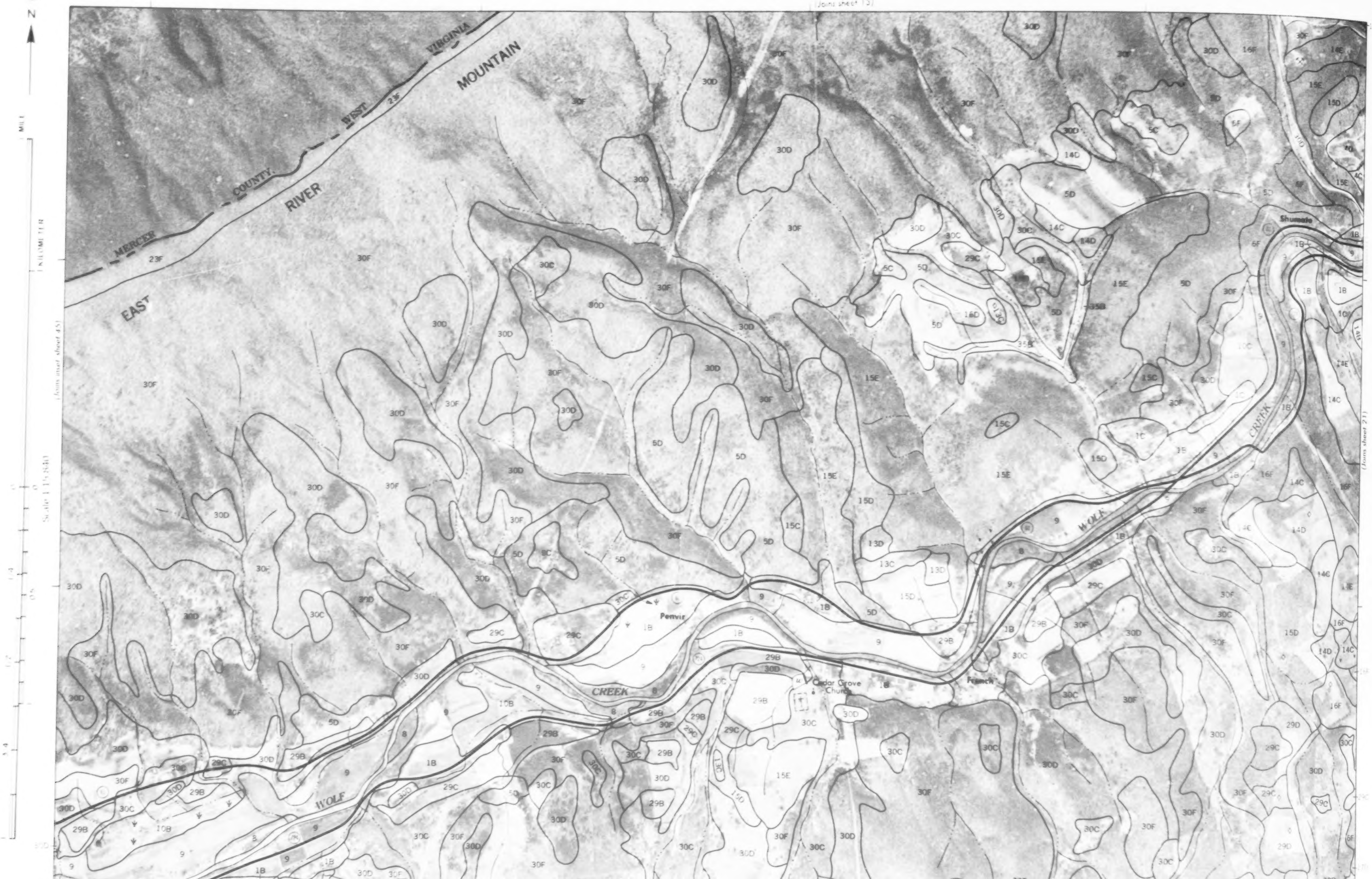
MILE
KILOMETER
0
1/4
1/2
3/4
1
0.5
Scale 1:15 840

photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

⑳

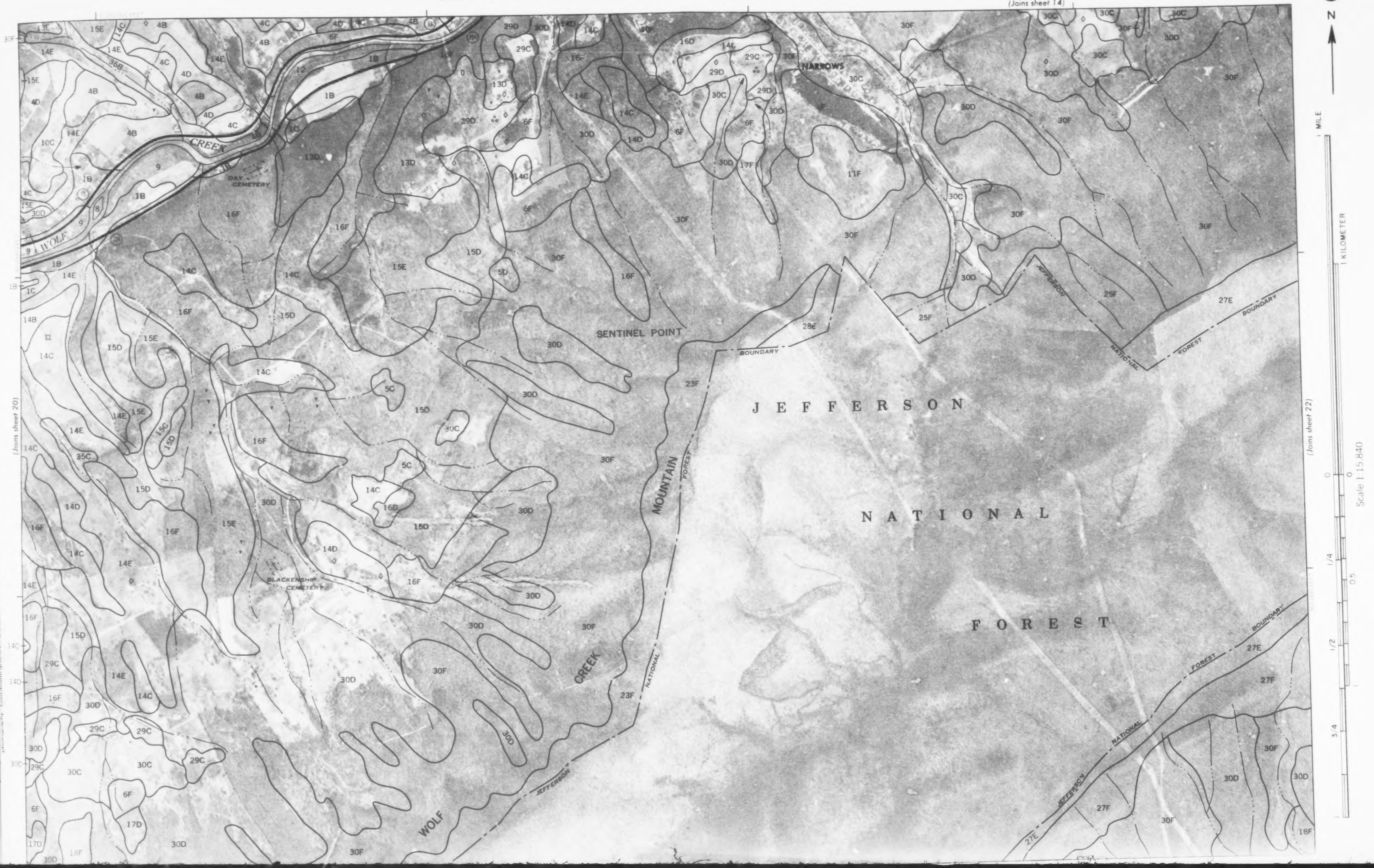
SOIL SURVEY OF GILES COUNTY VIRGINIA — SHEET NUMBER 20

(Joins sheet 13)

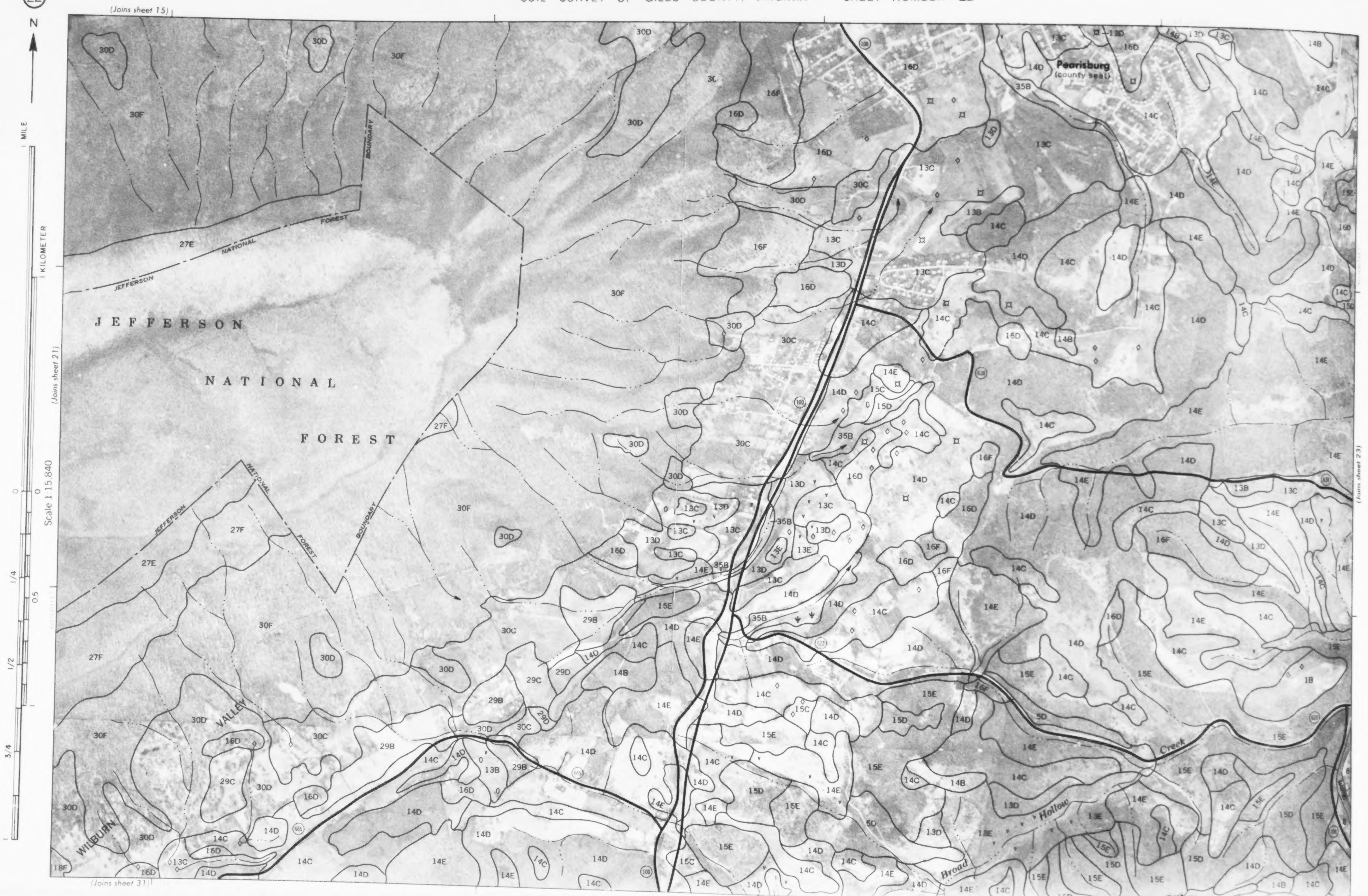

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
1
(Joins inset sheet 45)
(Joins sheet 21)
EAST RIVER MOUNTAIN
MERCER COUNTY
WEST VIRGINIA
WOLF CREEK
Penvir
Cedar Grove Church
French
Shumate

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, [illegible] photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 21

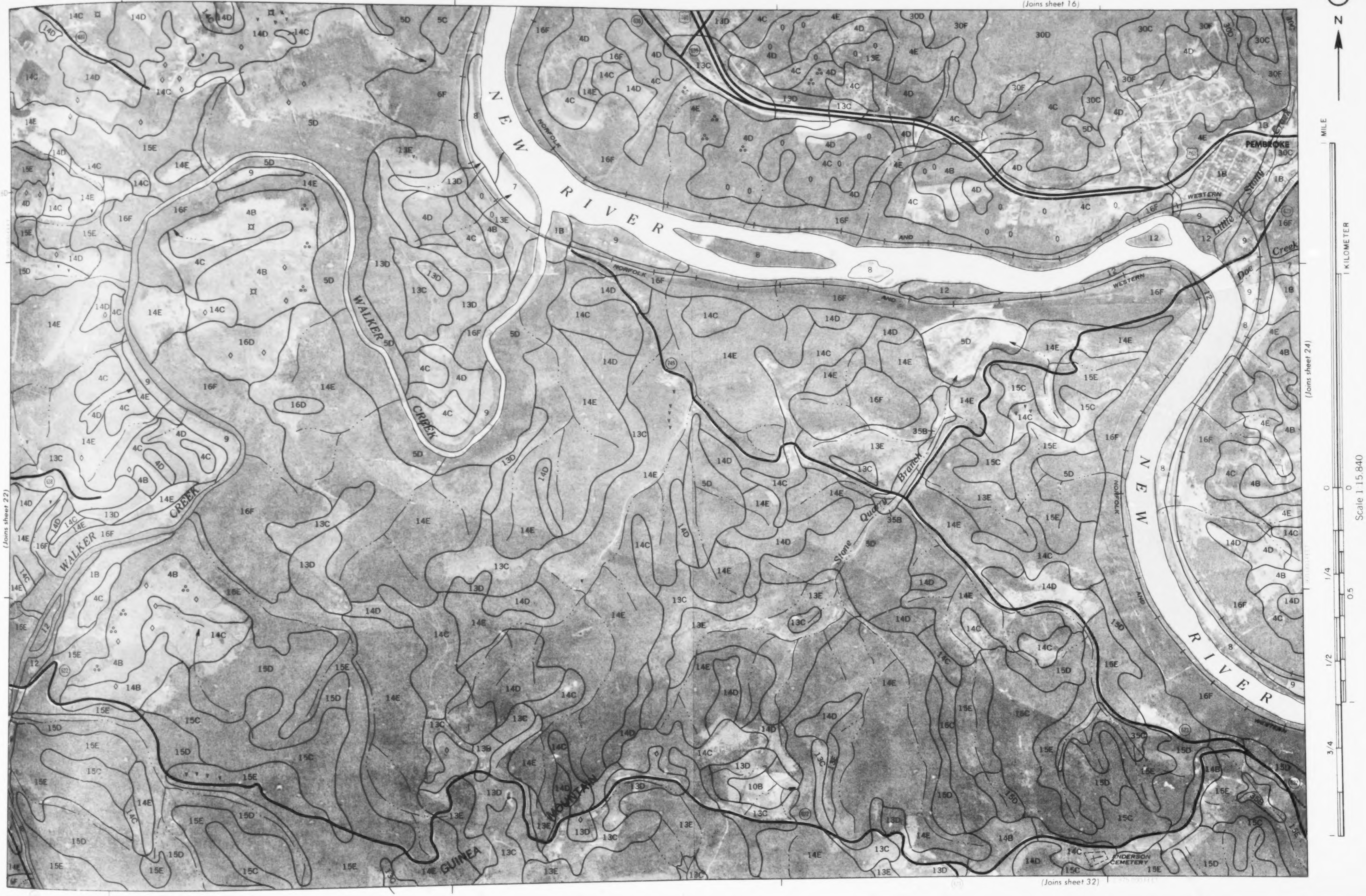

(Joins sheet 14)
(Joins sheet 20)
(Joins sheet 22)
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
1
NARROWS
WOLF CREEK
DAY CEMETERY
SENTINEL POINT
BLACKENSHIP CEMETERY
WOLF CREEK
MOUNTAIN
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
NATIONAL FOREST
BOUNDARY
1B
1C
4B
4C
4D
5C
5D
6F
8
9
10C
11F
12
13D
13E
14B
14C
14D
14E
15C
15D
15E
16D
16F
17D
17F
18F
23F
25F
27E
27F
28E
29C
29D
30C
30D
30F
35B
35C

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 22

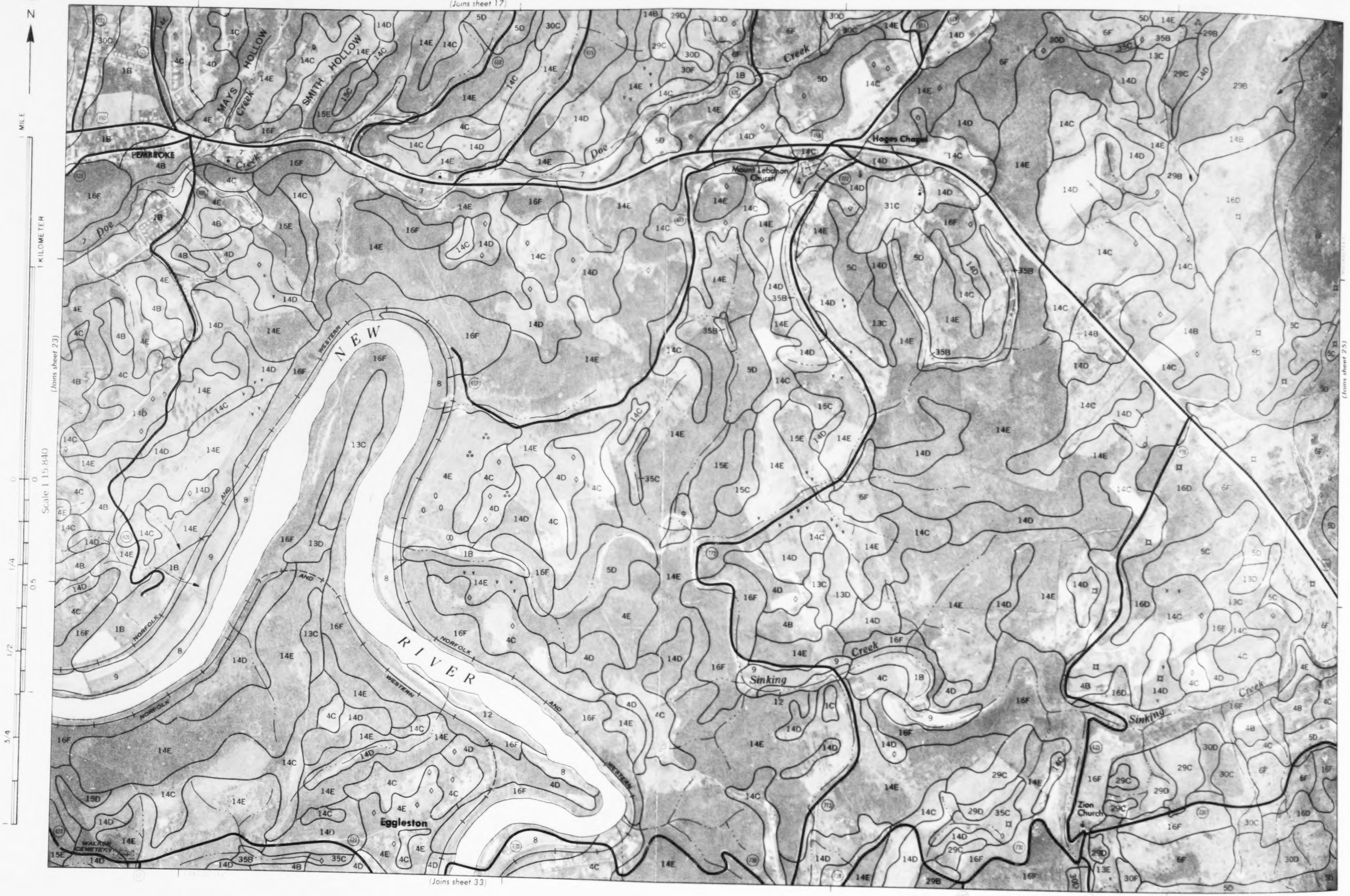

(Joins sheet 15)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 31)
N
MILE
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4
1
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
Pearisburg
(county seat)
WILBURN VALLEY
Broad Hollow
Creek
100
460
572
663
30D
30F
27E
27F
16D
16F
13C
13D
13B
14B
14C
14D
14E
15C
15D
15E
29B
29C
29D
30C
35B
5D
1B
18F

photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 23


23
N
(Joins sheet 16)
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 32)
NEW RIVER
WALKER CREEK
NORFOLK AND WESTERN
PEMBROKE
Little Stony Creek
Doe Creek
Stone Quarry Branch
GUINEA MOUNTAIN
ANDERSON CEMETERY
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0
0.5
Scale 1:15 840

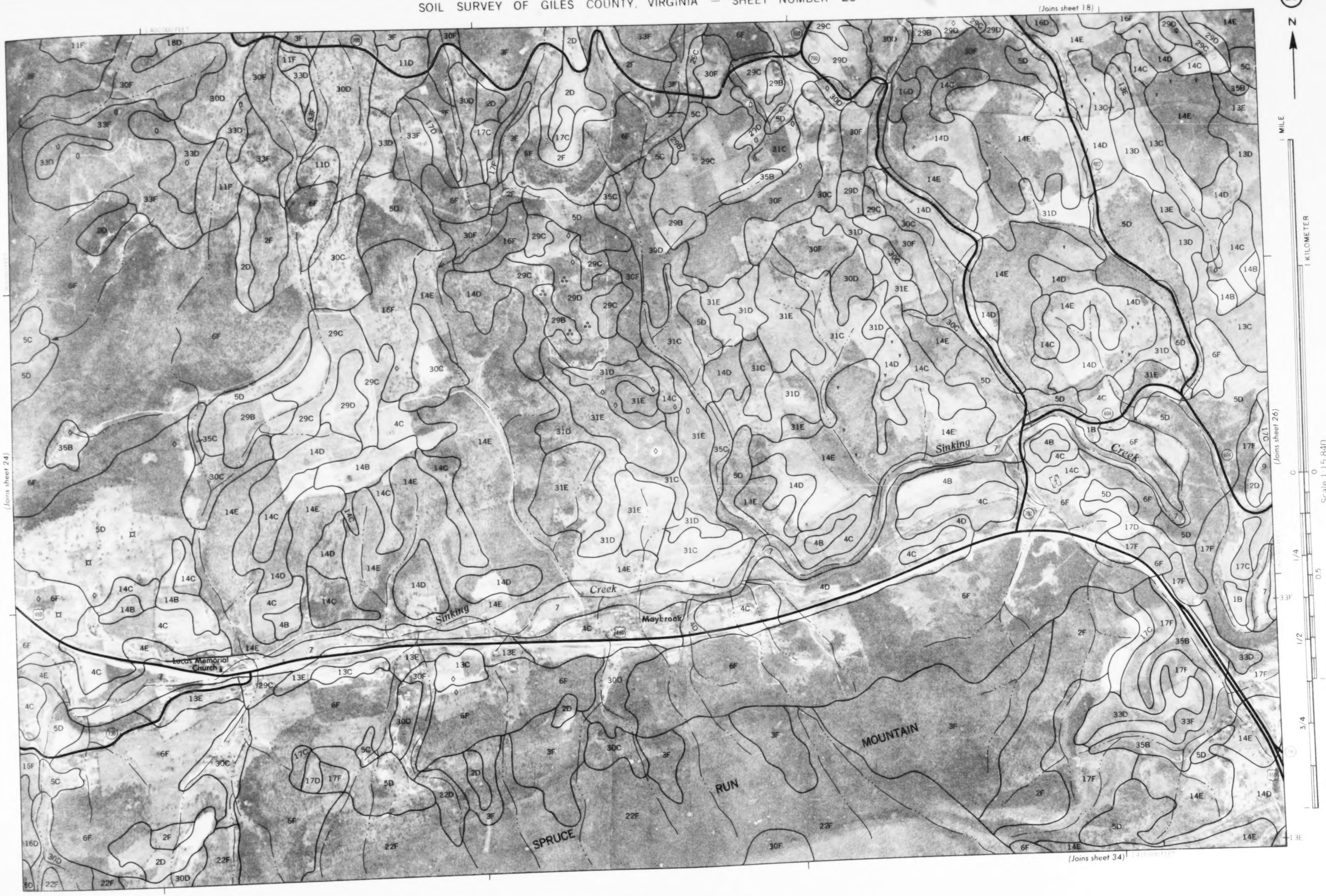
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 24


(Joins sheet 17)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 33)
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
PEMBROKE
MAYS HOLLOW
SMITH HOLLOW
Mays Creek
Doe Creek
Doe
Hoges Chapel
Mount Lebanon Church
NEW RIVER
NORFOLK AND WESTERN
Sinking Creek
Eggleston
WALKER CEMETERY
Zion Church
Creek

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

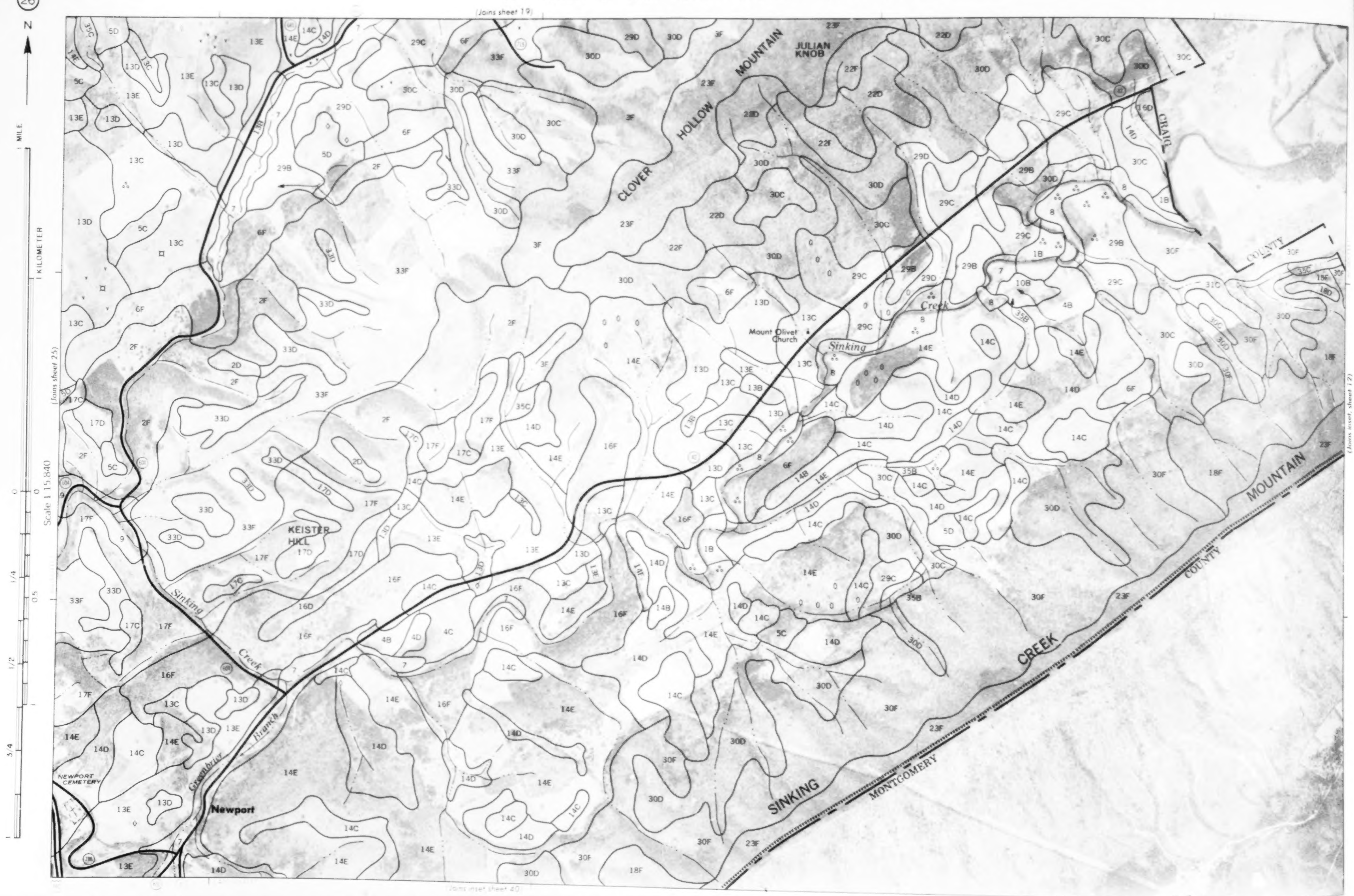
(Joins sheet 24)

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 25


(Joins sheet 18)
25
N
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 34)
Sinking Creek
Sinking Creek
Maybrook
Lucas Memorial Church
MOUNTAIN
SPRUCE RUN
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
1 400 000 FEET
460
700
604
5C
5D
6F
14C
14D
14E
29C
30C
31C
31D
31E

㉖

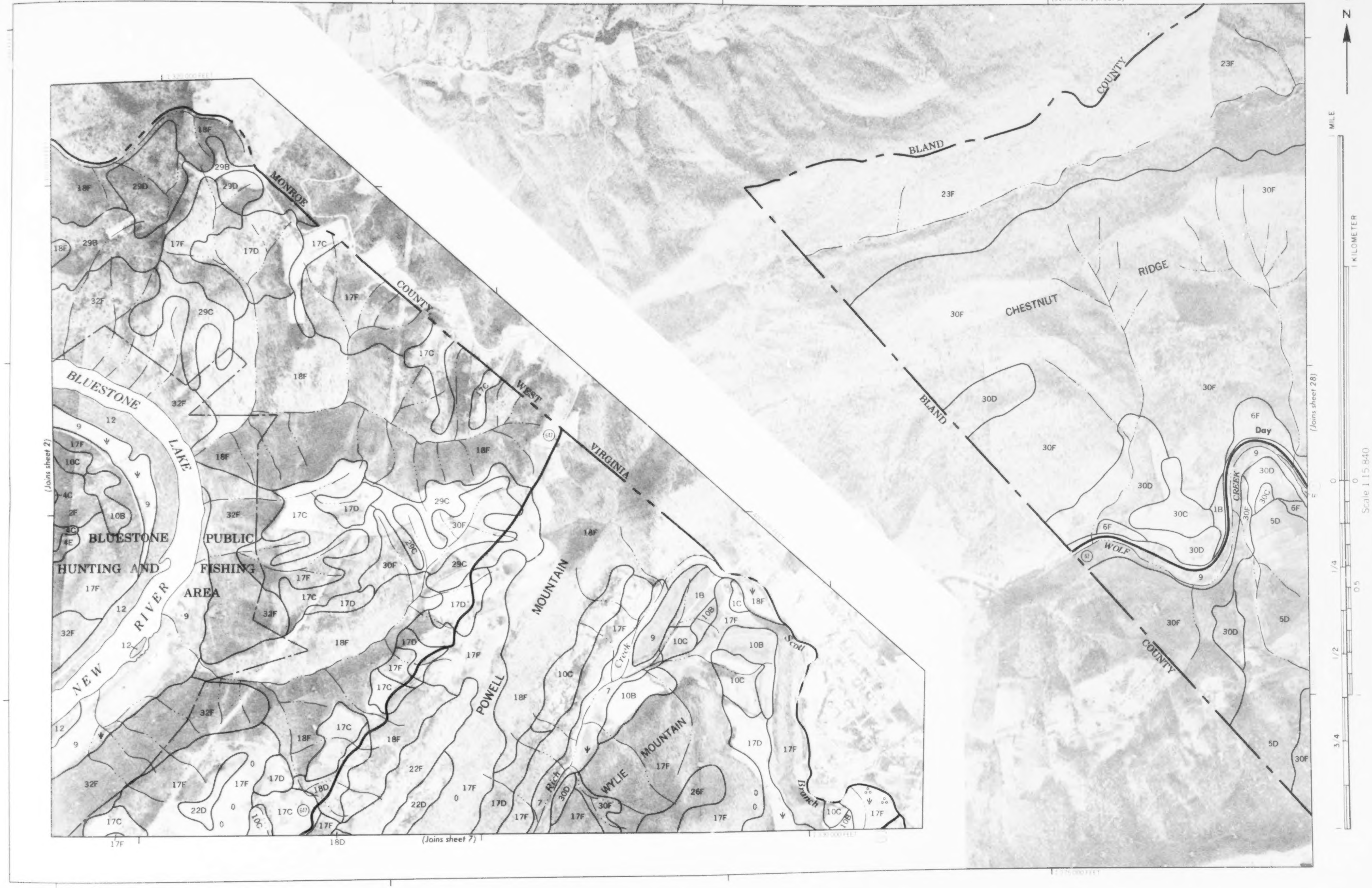
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 26


(Joins sheet 19)
(Joins sheet 25)
(Joins inset, sheet 12)
(Joins inset sheet 40)
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
CLOVER HOLLOW MOUNTAIN
JULIAN KNOB
CRAIG COUNTY
Sinking Creek
Mount Olivet Church
KEISTER HILL
Greenbrier Branch
Newport
NEWPORT CEMETERY
SINKING CREEK MOUNTAIN
MONTGOMERY COUNTY
13E
14C
14D
14E
29C
6F
33F
29D
30D
3F
23F
22D
22F
30C
5D
13D
13C
5C
6F
2F
2D
29B
33D
30D
17C
17D
17F
16D
16F
4B
4C
4D
1B
8
10B
35B
35C
18F
18D
31C
30F
13B
14B
9
7

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

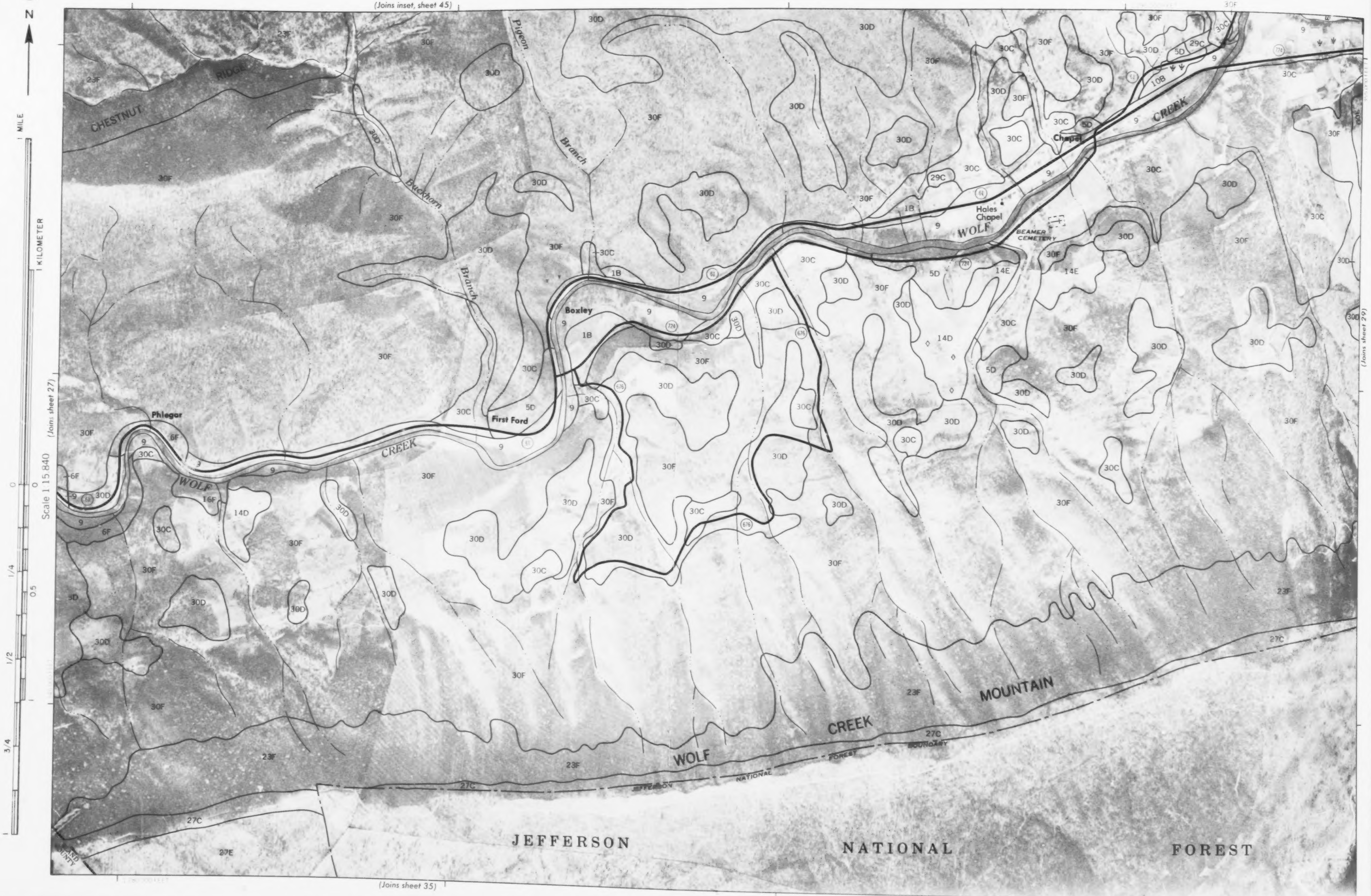
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps controlled photomosaics prepared from 1978 aerial

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 27

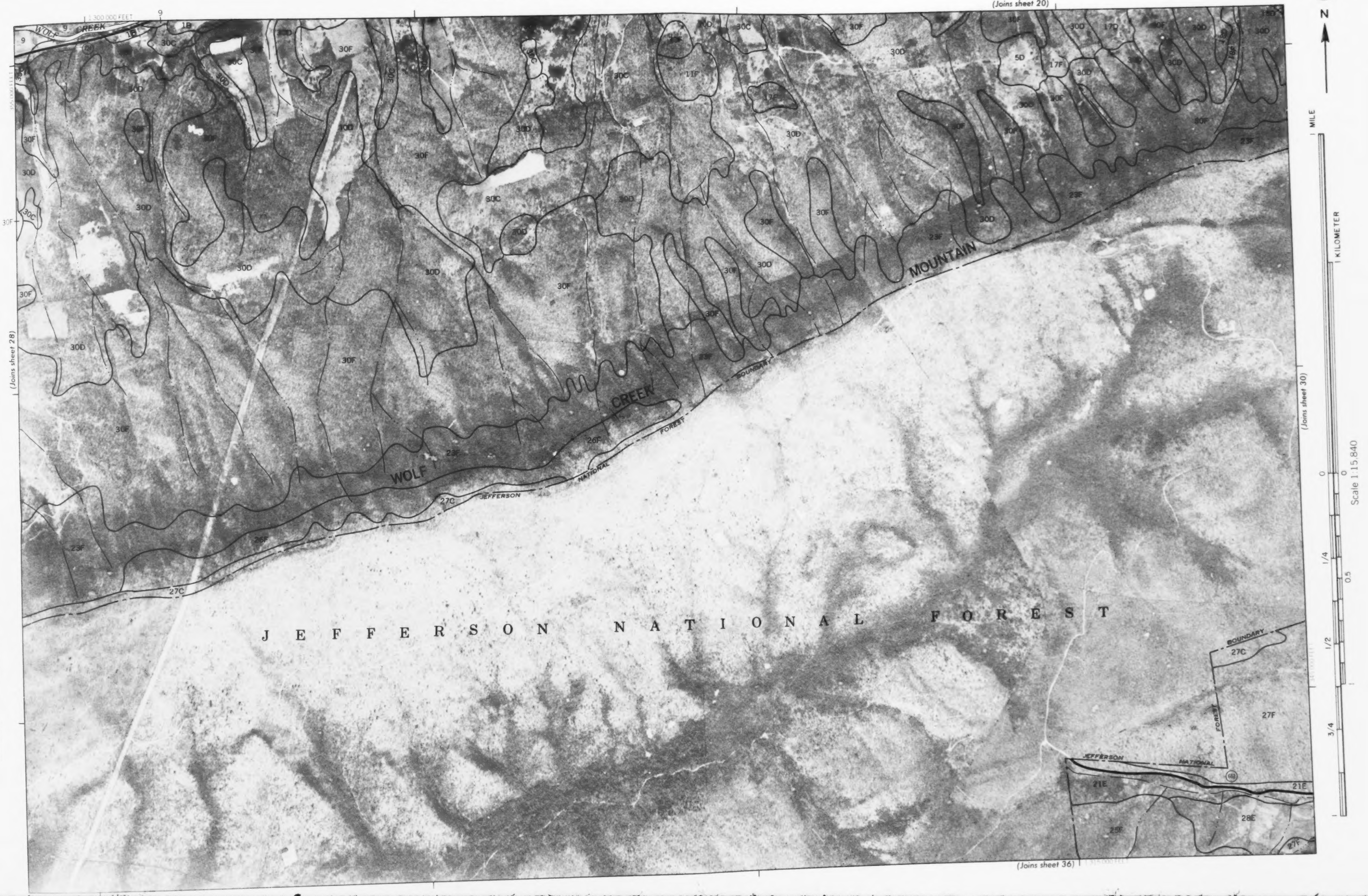

(Joins inset, sheet 2)
(Joins sheet 2)
(Joins sheet 28)
(Joins sheet 7)
N
MONROE COUNTY WEST VIRGINIA
BLAND COUNTY
BLAND COUNTY
CHESTNUT RIDGE
BLUESTONE LAKE
NEW RIVER
BLUESTONE PUBLIC HUNTING AND FISHING AREA
POWELL MOUNTAIN
WYLIE MOUNTAIN
Creek
Rich
Scott Branch
WOLF CREEK
Day
641
61
18F
29B
29D
17F
17D
17C
18F
29C
32F
12
9
17F
10C
4C
2F
10B
3C
4E
30F
22F
22D
18D
1B
1C
10B
10C
7
30D
26F
23F
30C
6F
5D
0
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

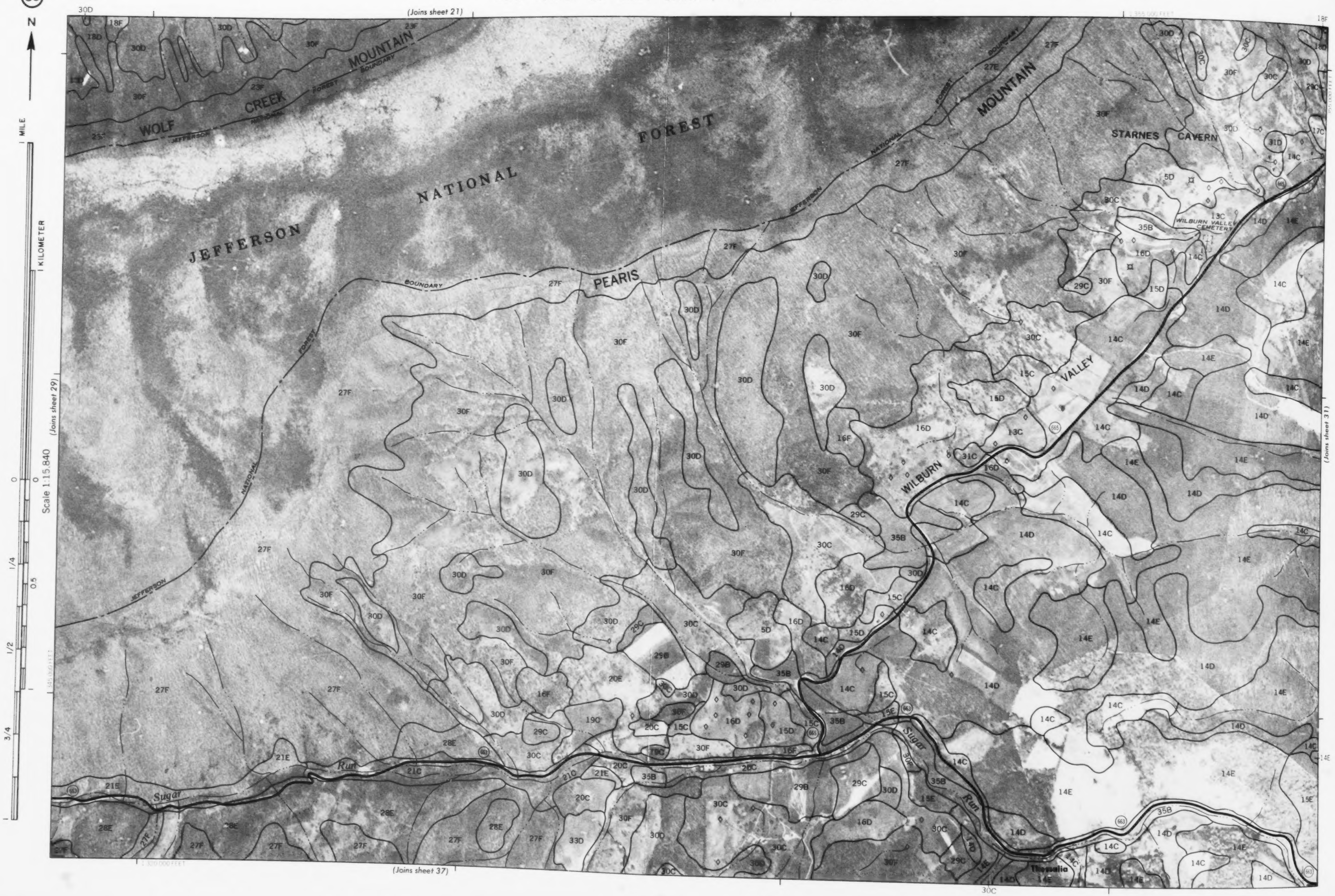
㉘

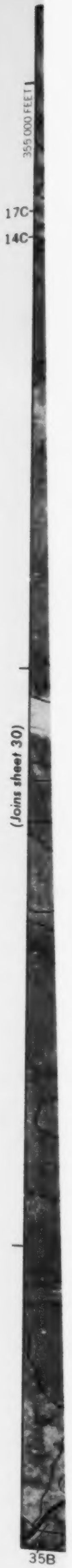
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 28


(Joins inset, sheet 45)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 35)
N
MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
CHESTNUT RIDGE
Pigeon Branch
Buckhorn Branch
Branch
Phlegar
First Ford
Boxley
Hales Chapel
Chapel
BEAMER CEMETERY
WOLF CREEK
WOLF CREEK MOUNTAIN
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
61
728
676
1B
5D
6F
9
10B
14D
14E
16F
23F
27C
27E
29C
30C
30D
30F

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


(Joins sheet 20)
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 36)
1 300 000 FEET
N
WOLF CREEK
WOLF CREEK MOUNTAIN
JEFFERSON NATIONAL FOREST BOUNDARY
JEFFERSON NATIONAL FOREST
BOUNDARY
FOREST
9
1B
30C
30D
30F
10D
11F
17D
17F
5D
23F
26F
27C
27F
21E
28E
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840

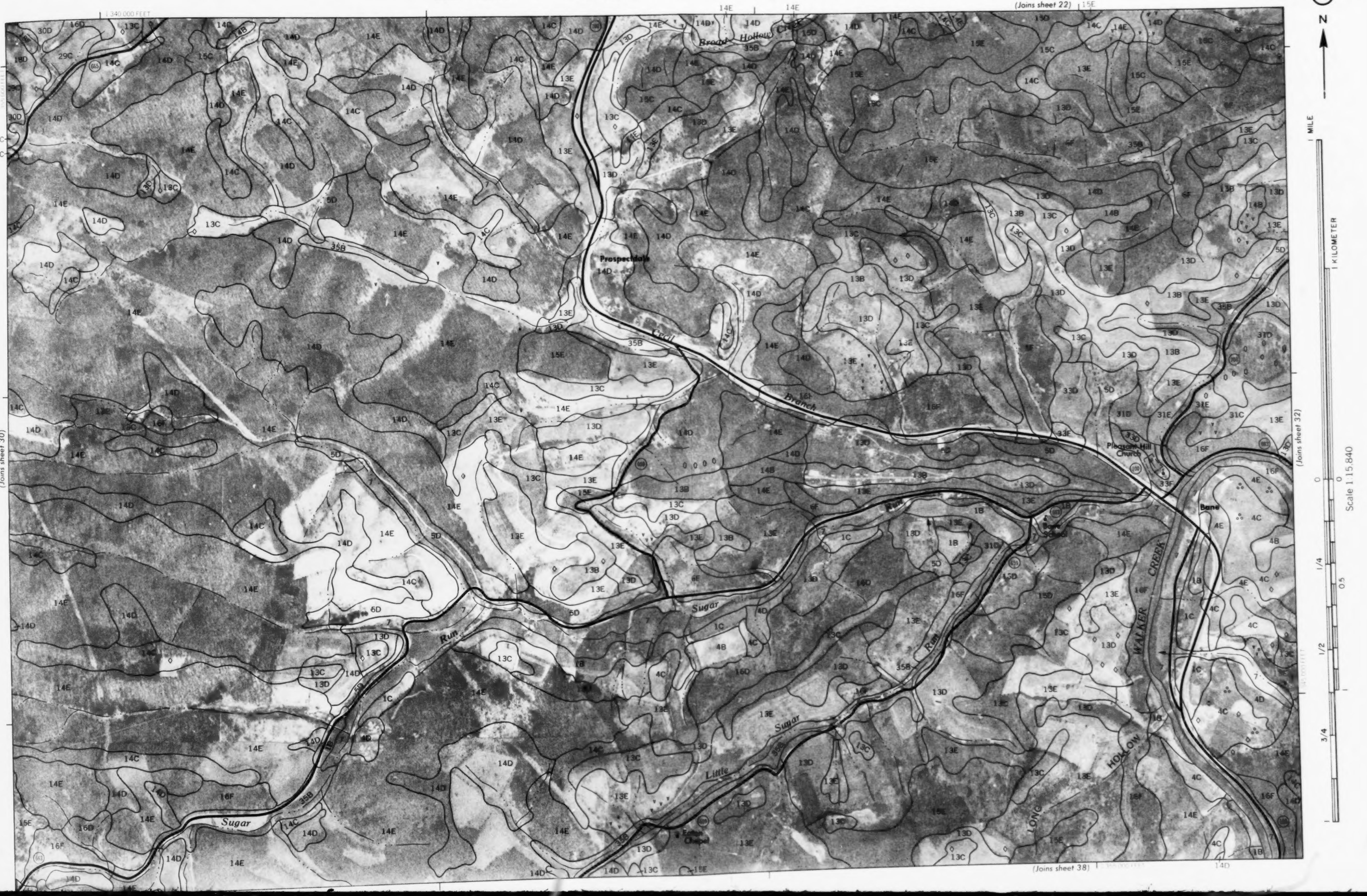

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4
(Joins sheet 21)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 37)
2 355 000 FEET
1 320 000 FEET
355 000 FEET
345 000 FEET
WOLF CREEK MOUNTAIN
MOUNTAIN
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
STARNES CAVERN
WILBURN VALLEY CEMETERY
WILBURN VALLEY
PEARIS
Sugar Run
Thessalia
663
665
30D
18F
18D
30F
23F
25F
27F
27E
30C
29C
17C
31D
14C
5D
13C
35B
16D
15D
14D
14E
15C
16F
31C
29B
20E
19C
20C
21E
21C
28E
15E
33D
14E


355 000 FEET
17C
14C
(Joins sheet 30)
35B

This soil survey map was compiled by the U.S. Department of Agriculture, Soil C[illegible] photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

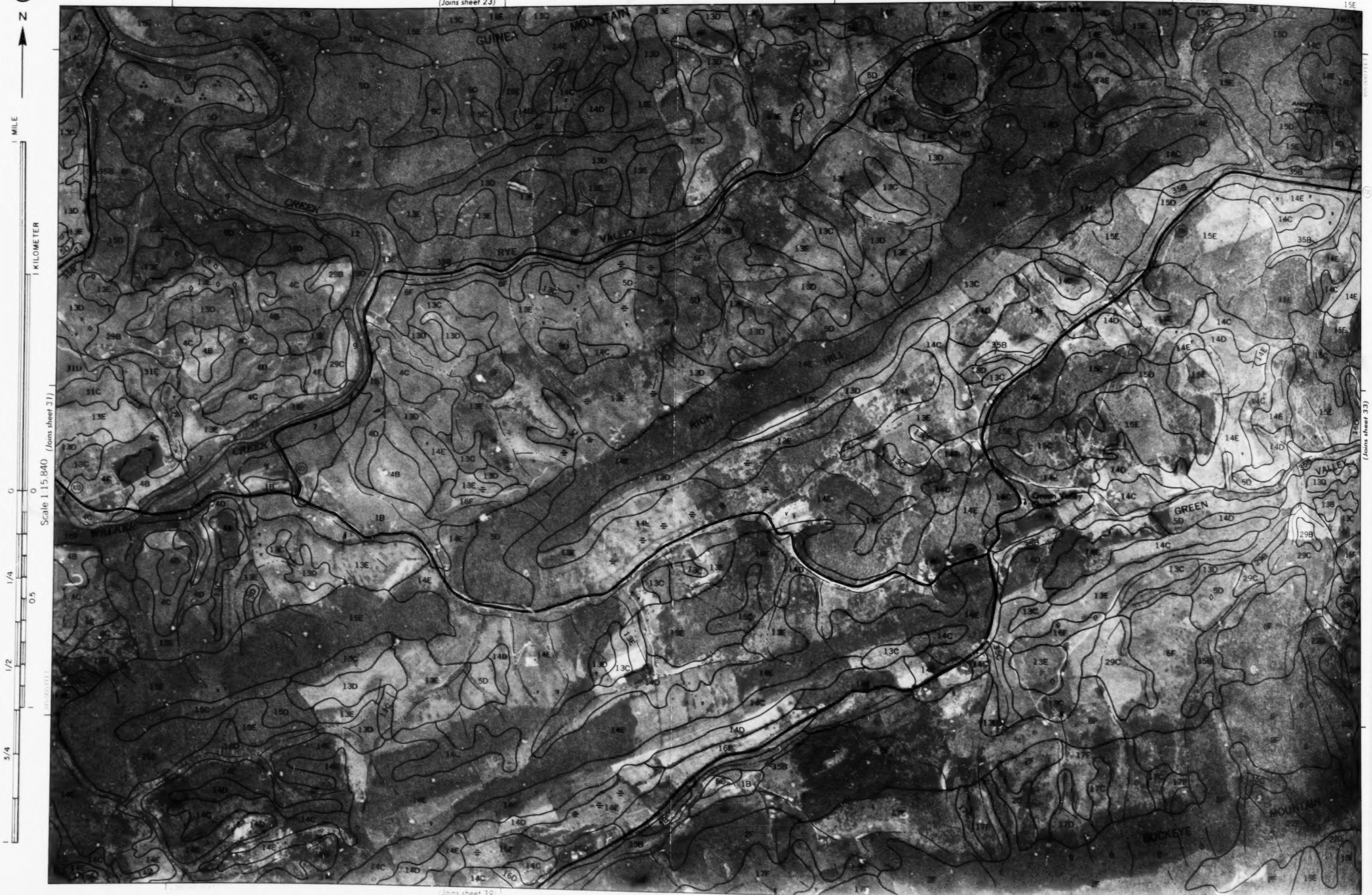
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 31

31



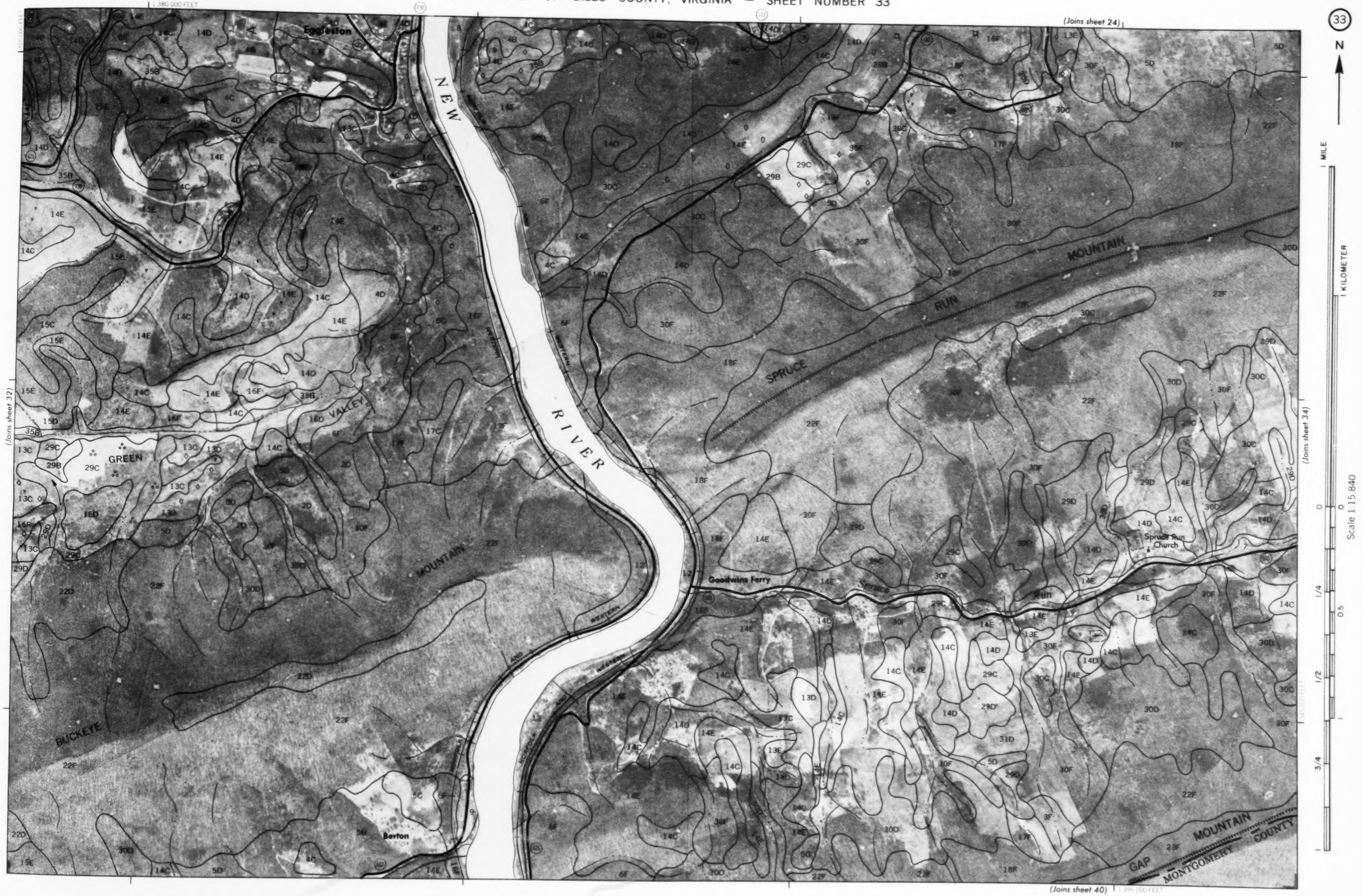
1 340 000 FEET
(Joins sheet 22)
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 38)
N
Broad Hollow Creek
Prospectdale
Cecil Branch
Pleasant Hill Church
Bane
Sugar Run
Little Sugar Run
WALKER CREEK
LONG HOLLOW
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 32


N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0.5
Scale 1:15 840
(Joins sheet 23)
(Joins sheet 31)
(Joins sheet 33)
(Joins sheet 39)
GUINEY MOUNTAIN
WALKER CREEK
CREEK
RYE VALLEY
RICH HILL
GREEN VALLEY
BUCKEYE MOUNTAIN

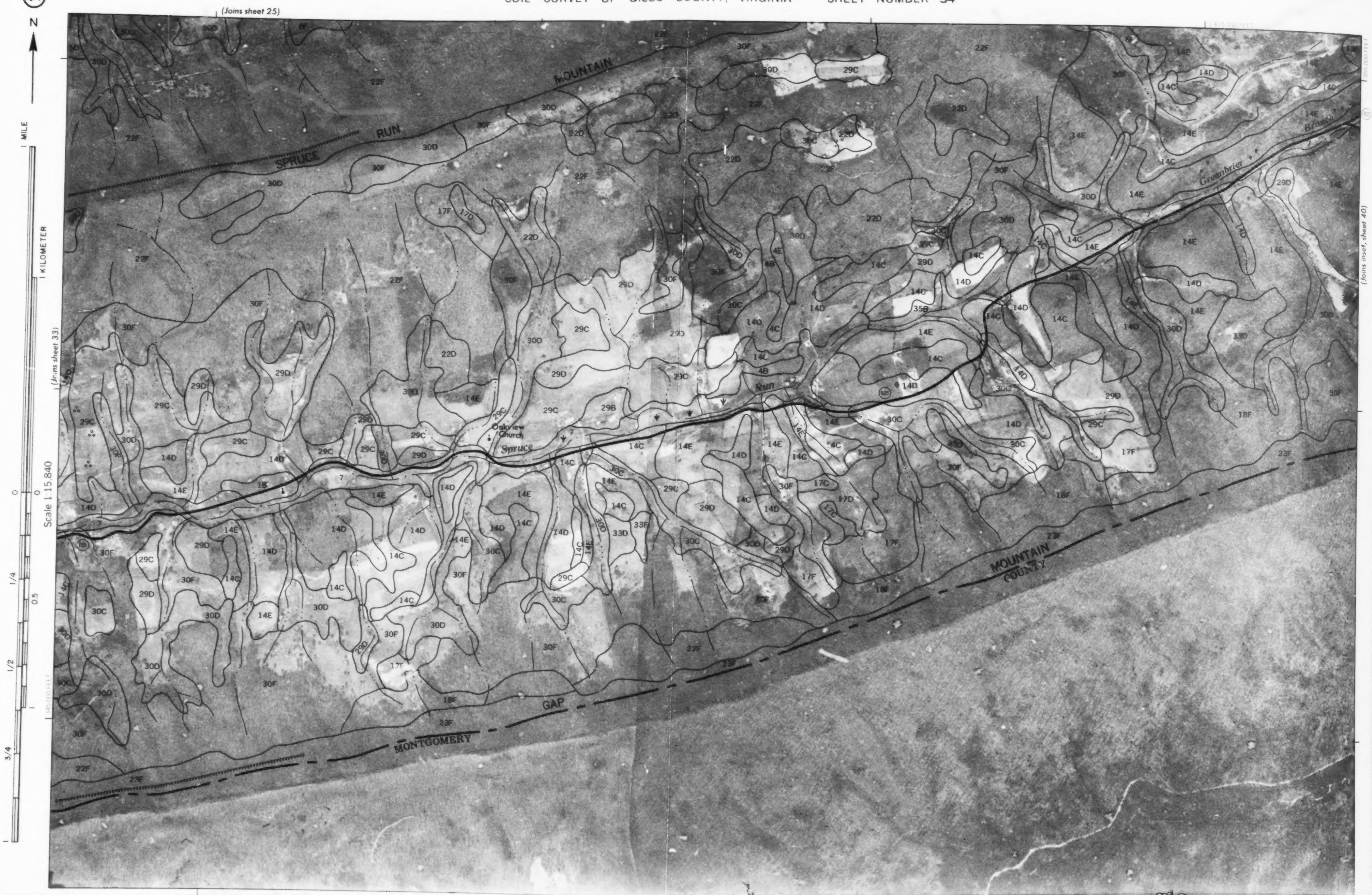
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 33


33
N
1 380 000 FEET
1 395 000 FEET
(Joins sheet 24)
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 40)
Eggleston
NEW RIVER
SPRUCE RUN MOUNTAIN
GREEN VALLEY
BUCKEYE MOUNTAIN
GAP MOUNTAIN
MONTGOMERY COUNTY
Goodwins Ferry
Spruce Run Church
Spruce Run
Barton
NORFOLK AND WESTERN
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0.5
Scale 1:15 840
14C
14D
14E
4C
4D
35B
15E
15C
15D
13C
13E
16F
16D
29B
29C
29D
30C
30D
30F
22D
22F
23F
18F
17C
17F
5C
5D
6F
2D
3F
31D
4B
28B
12
13
0

... base maps ... photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned

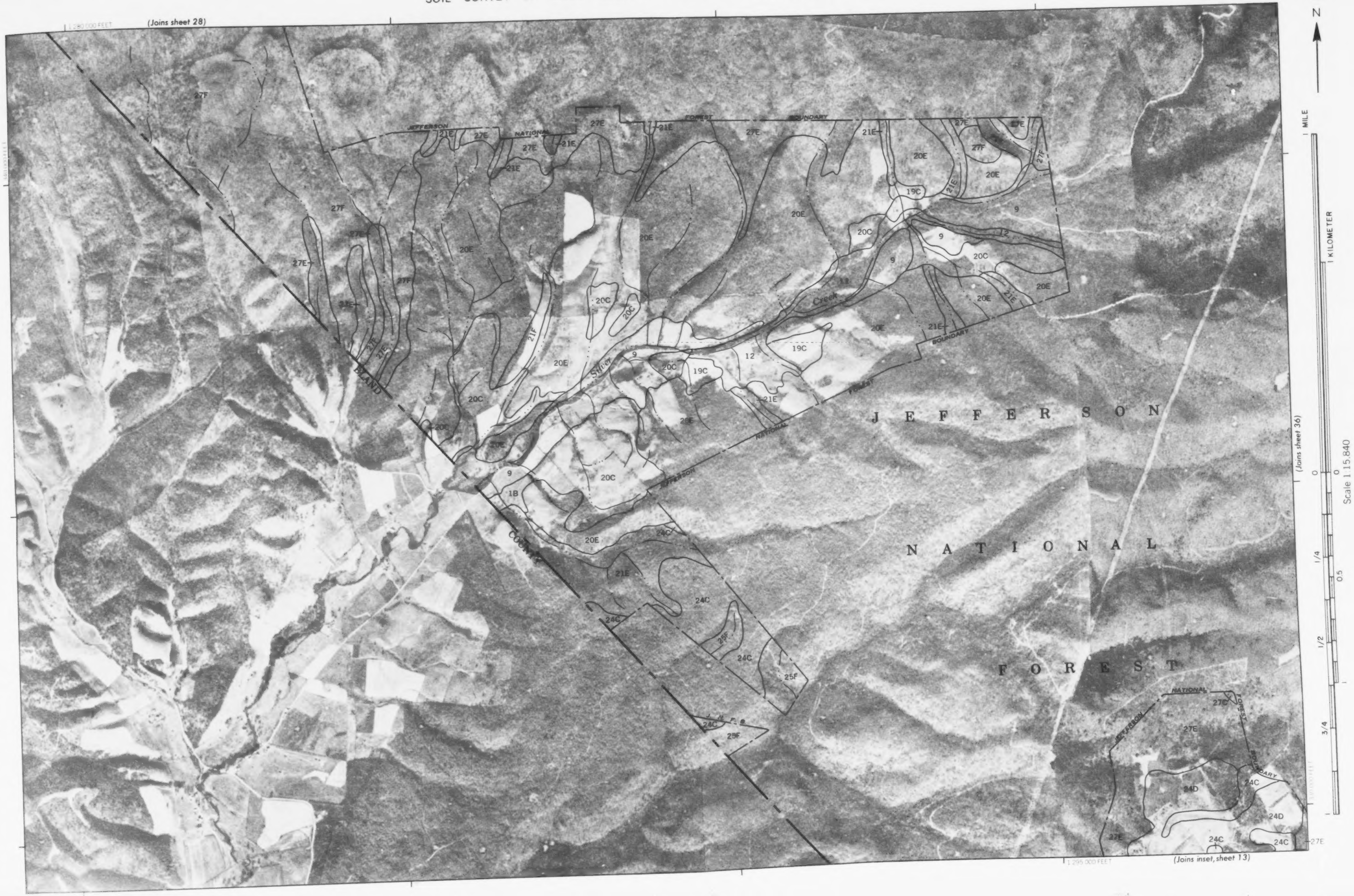
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 34


(Joins sheet 25)
N
(Joins sheet 33)
(Joins inset, sheet 40)
MILE
KILOMETER
Scale 1:15,840
0
1/4
1/2
3/4
1
0
0.5
1
SPRUCE RUN MOUNTAIN
GAP MOUNTAIN
MONTGOMERY COUNTY
Spruce Run
Greenbrier Branch
Oakview Church
605
7
14C
14D
14E
17C
17D
17F
18F
22D
22F
23F
29B
29C
29D
30C
30D
30F
33D
33F
35B
4B
4C
4E

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps controlled … photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

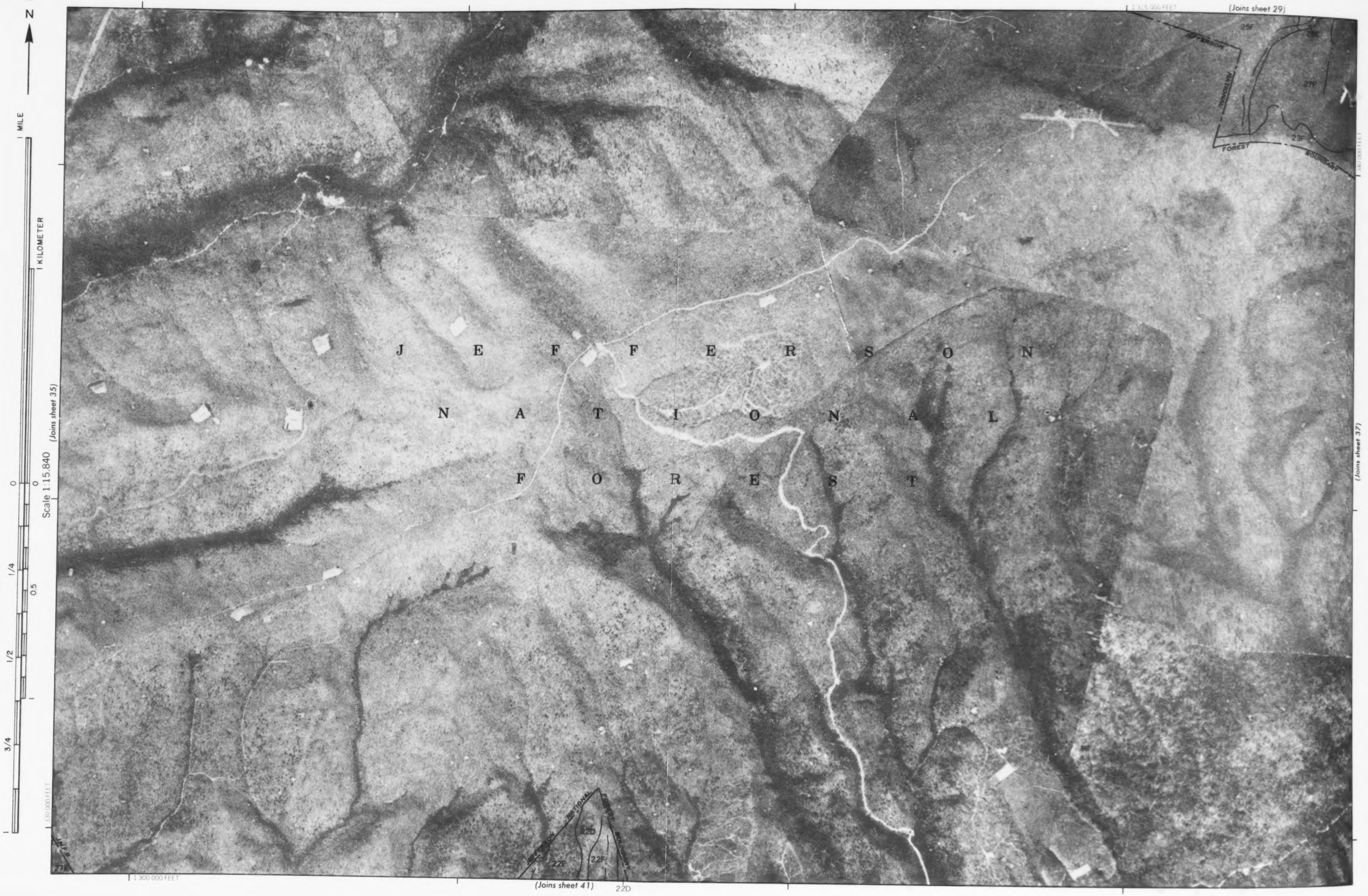
No. 80-256 Card 2

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 35

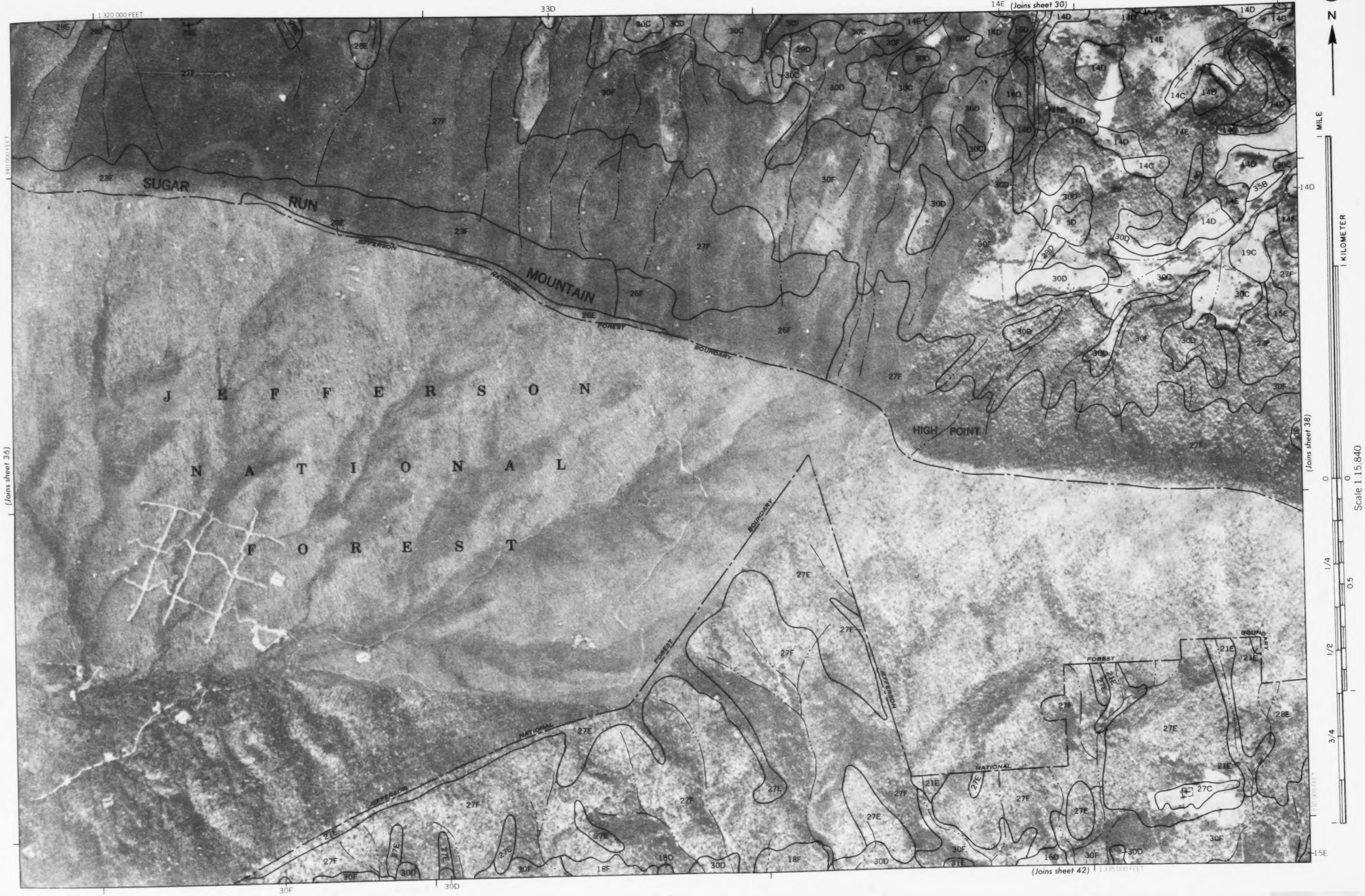

(Joins sheet 28)
1 280 000 FEET
(Joins sheet 36)
(Joins inset, sheet 13)
1 295 000 FEET
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
BLAND COUNTY
Silver Creek
N F B
1B
9
12
19C
20C
20E
21E
21F
24C
24D
25F
27E
27F

[illegible] and cooperating agencies. Base maps controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 36


N
1 MILE
1 KILOMETER
0
0
Scale 1:15 840
1/4
0.5
1/2
3/4
1
(Joins sheet 29)
1 325 000 FEET
340 000 FEET
JEFFERSON
NATIONAL
FOREST
BOUNDARY
25F
28E
27F
23F
J E F F E R S O N
N A T I O N A L
F O R E S T
(Joins sheet 35)
(Joins sheet 37)
330 000 FEET
J.N.F.B.
27F
1 300 000 FEET
22D
22F
22F
(Joins sheet 41)
22D

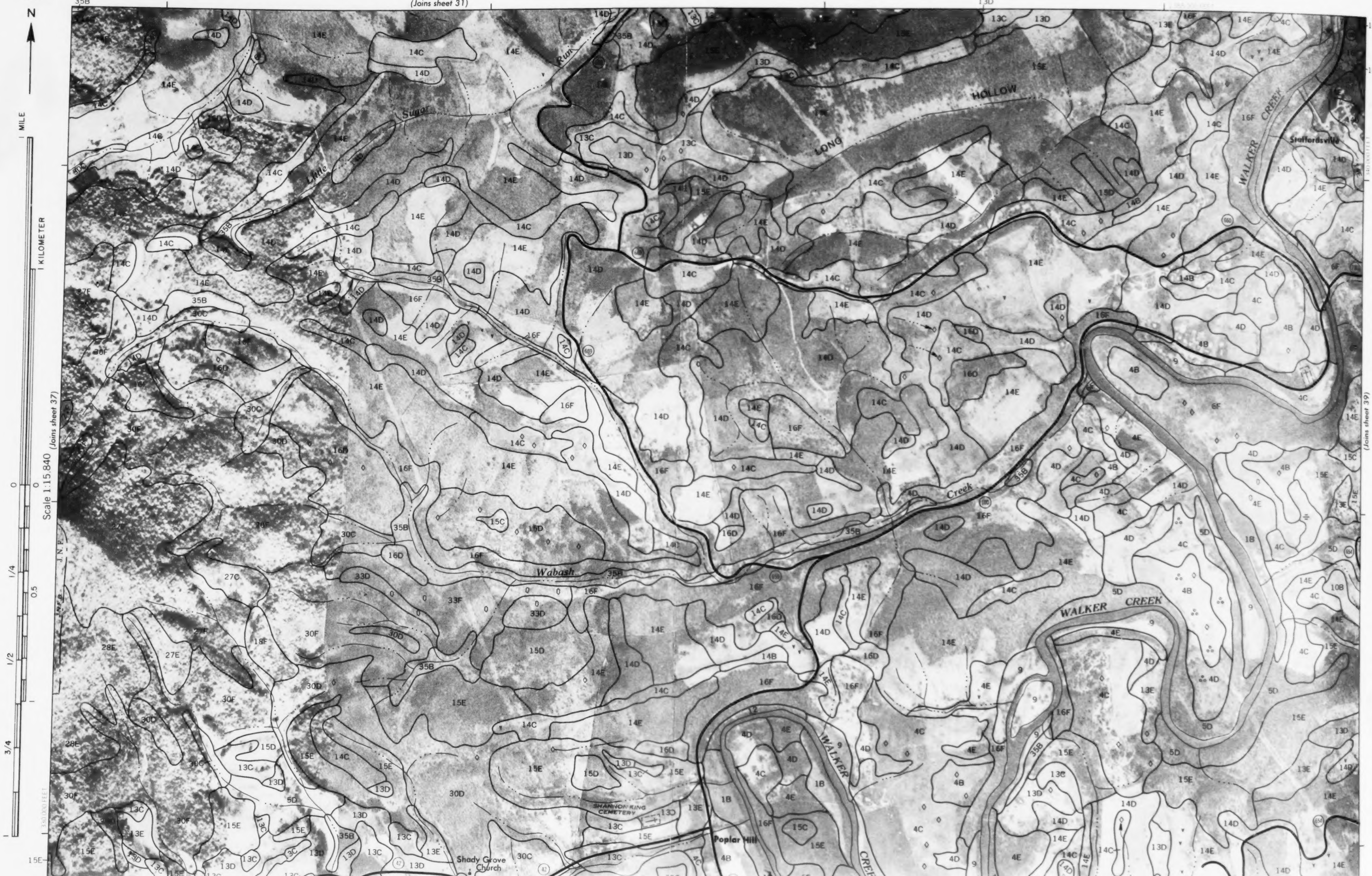
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 37



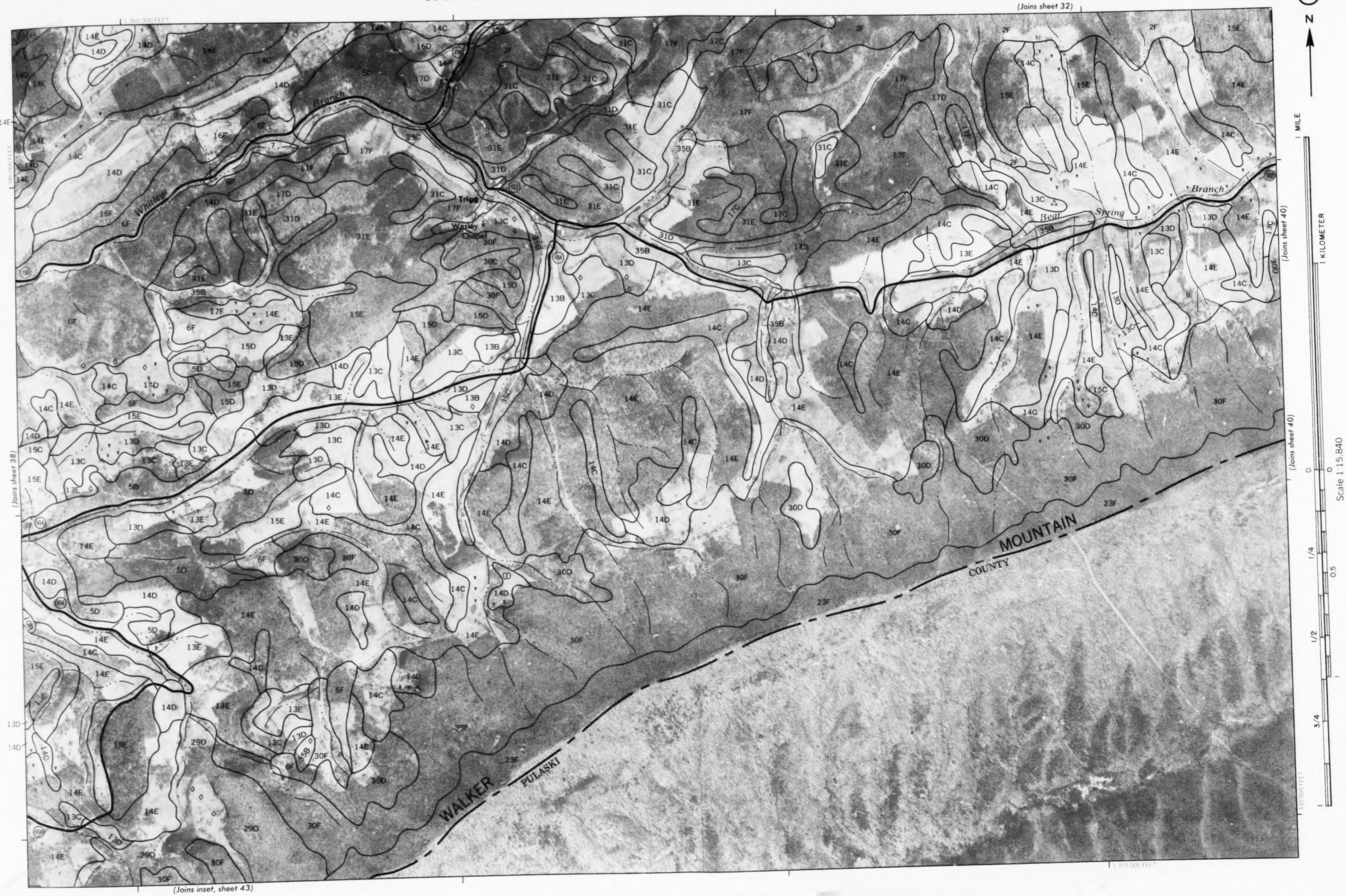
(Joins sheet 30)
(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 42)
1 320 000 FEET
1 335 000 FEET
340 000 FEET
330 000 FEET
SUGAR RUN MOUNTAIN
HIGH POINT
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
Scale 1:15 840
33D
14E
35B
14D
14C
14E
15E
30C
30D
30F
27F
27E
27C
28E
26F
26E
23F
19C
21E
18D
18F
16D
31E

photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 38


(Joins sheet 31)
(Joins sheet 37)
(Joins sheet 39)
N
1 MILE
1 KILOMETER
Scale 1:15,840
0
1/4
1/2
3/4
0.5
Little Sugar Run
LONG HOLLOW
WALKER CREEK
Staffordsville
Wabash Creek
SHANNON KING CEMETERY
Poplar Hill
Shady Grove Church
J.N.F.
14C
14D
14E
13C
13D
13E
15C
15D
15E
16D
16F
27C
27E
27F
28E
30C
30D
30F
33D
33F
35B
4B
4C
4D
4E
5D
6F
9
10B
1B
12

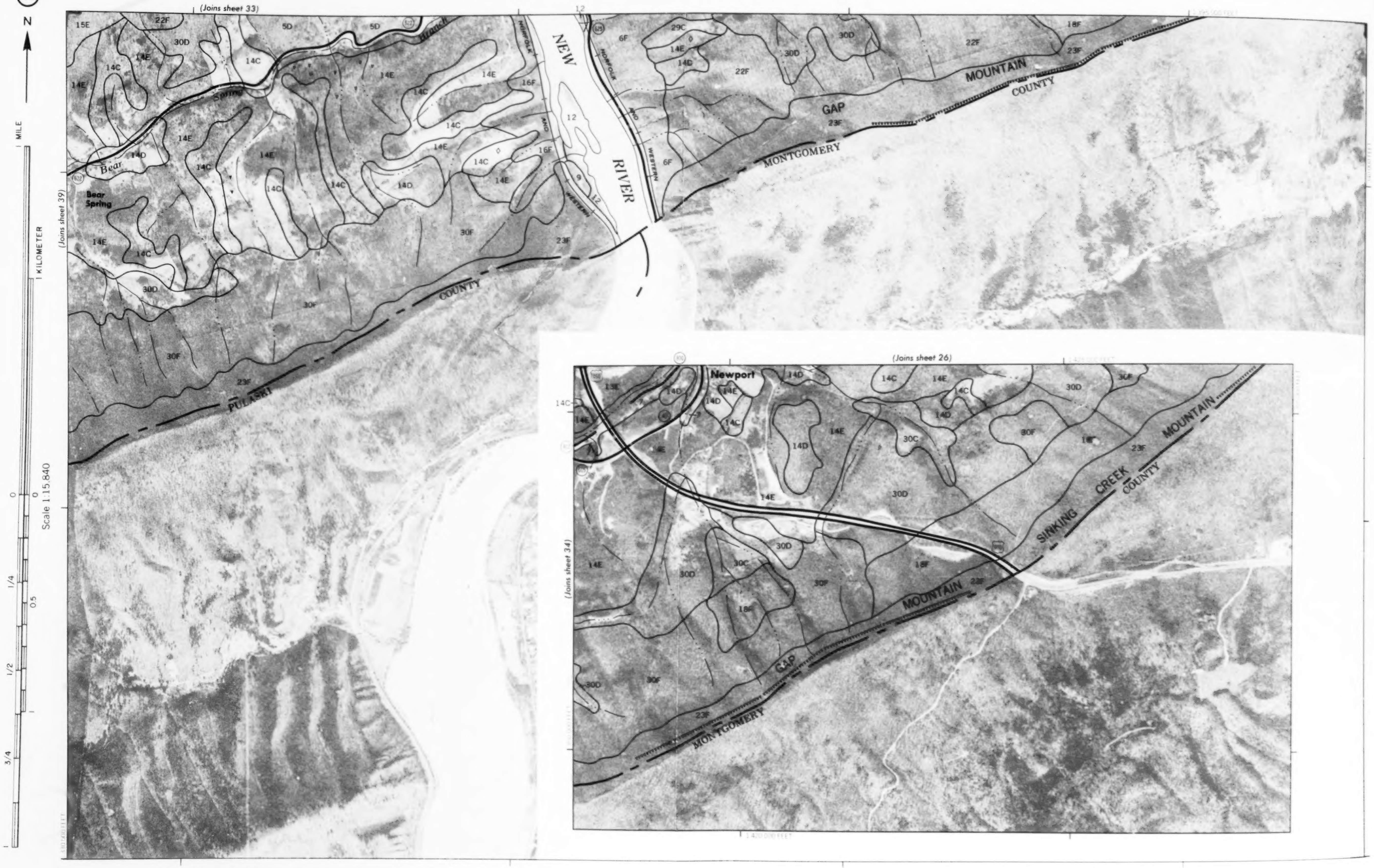
SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 39


(Joins sheet 32)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 40)
(Joins inset, sheet 43)
1 360 000 FEET
1 375 000 FEET
340 000 FEET
310 000 FEET
N
Whitley Branch
Trigg
Wesley Chapel
Bear Spring Branch
WALKER MOUNTAIN
PULASKI COUNTY
MILE
KILOMETER
0
1/4
1/2
3/4
0
0.5
Scale 1:15 840

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

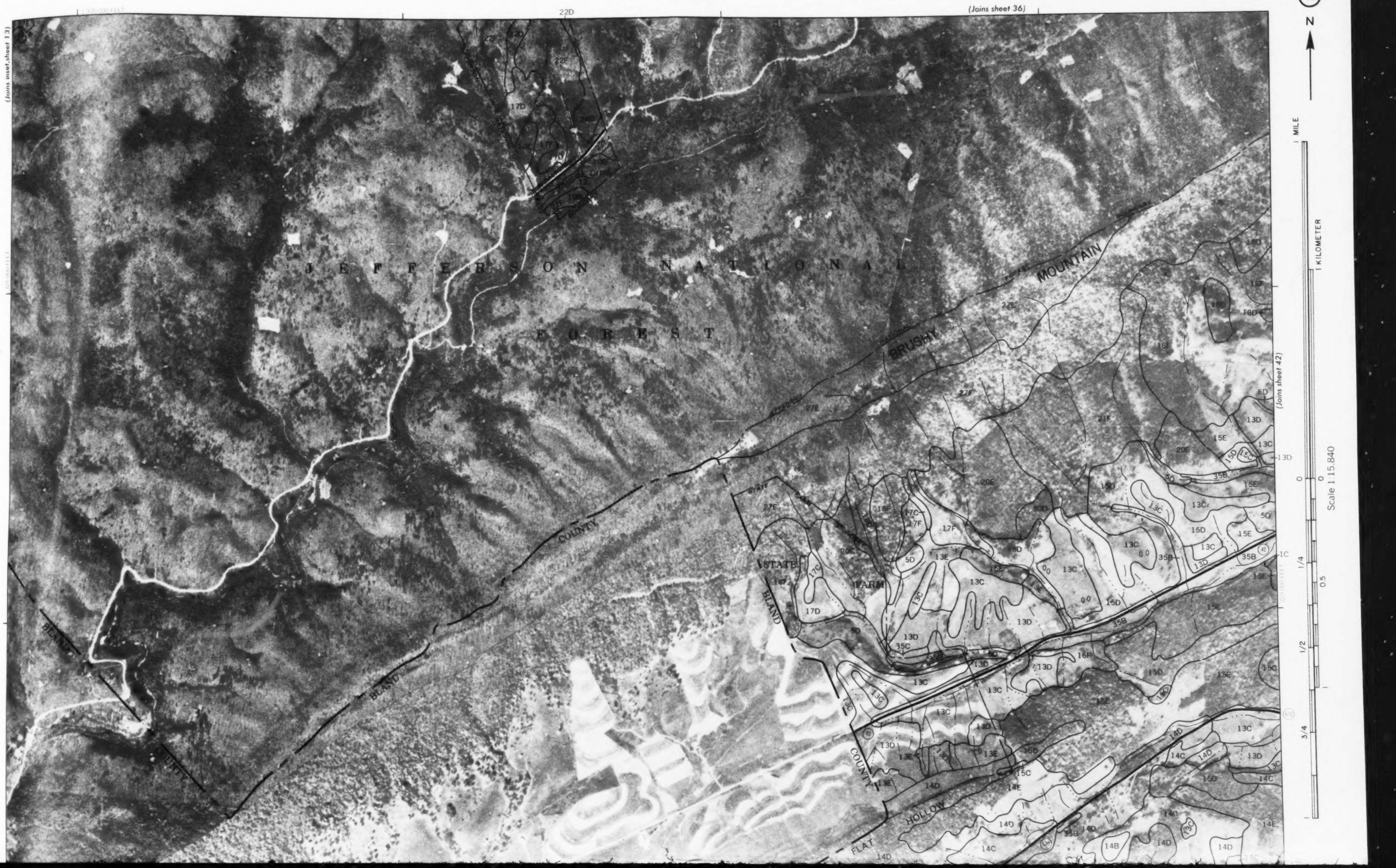
(40)

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 40

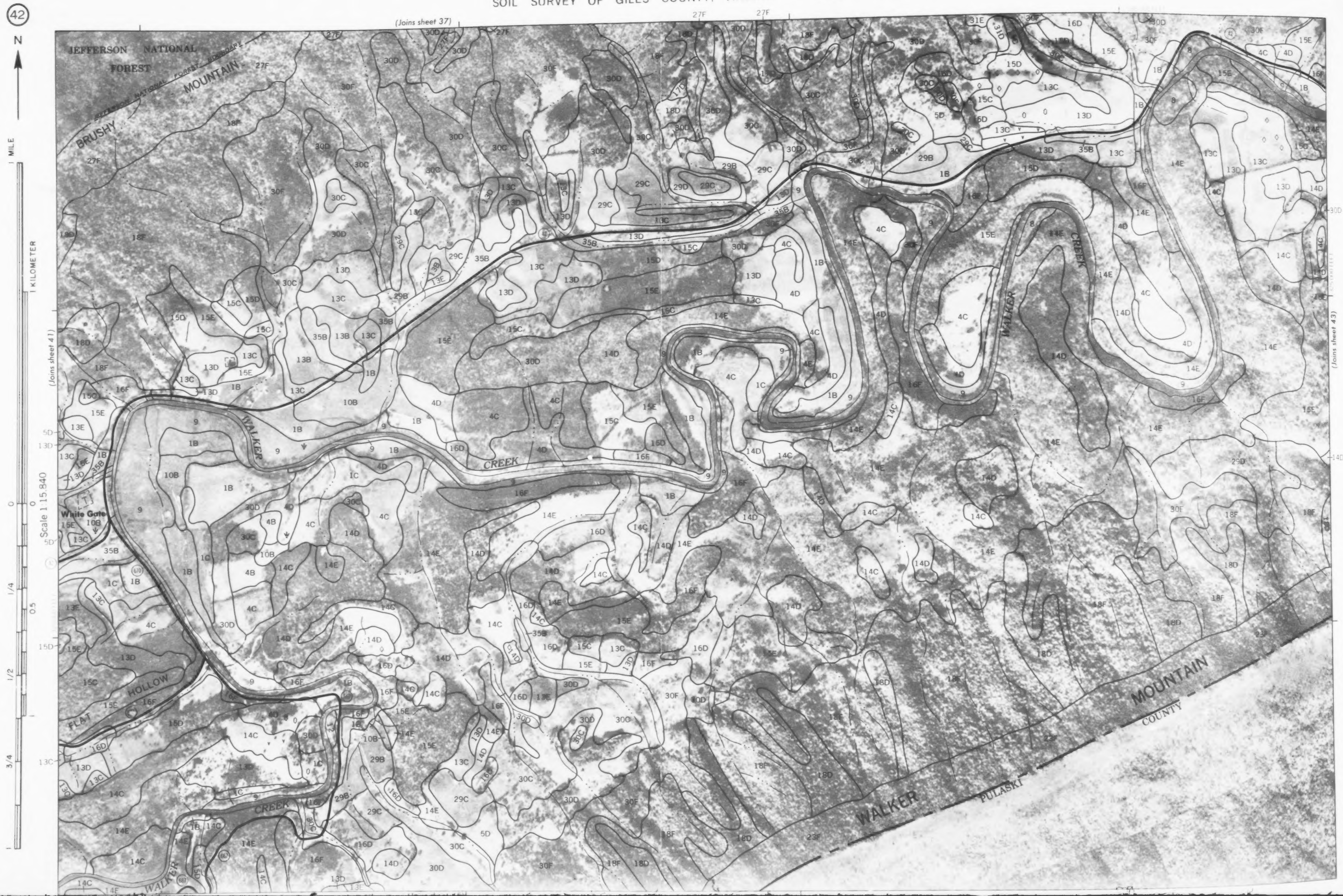

N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 33)
(Joins sheet 39)
(Joins sheet 26)
(Joins sheet 34)
NEW RIVER
NORFOLK AND WESTERN
Bear Spring
Bear Spring Branch
Newport
GAP MOUNTAIN
SINKING CREEK MOUNTAIN
MONTGOMERY COUNTY
PULASKI COUNTY
15E
22F
30D
5D
14E
14C
14D
16F
12
9
30F
23F
6F
29C
18F
13E
30C

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps controlled photomosaics prepared from 1978 aerial

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 41

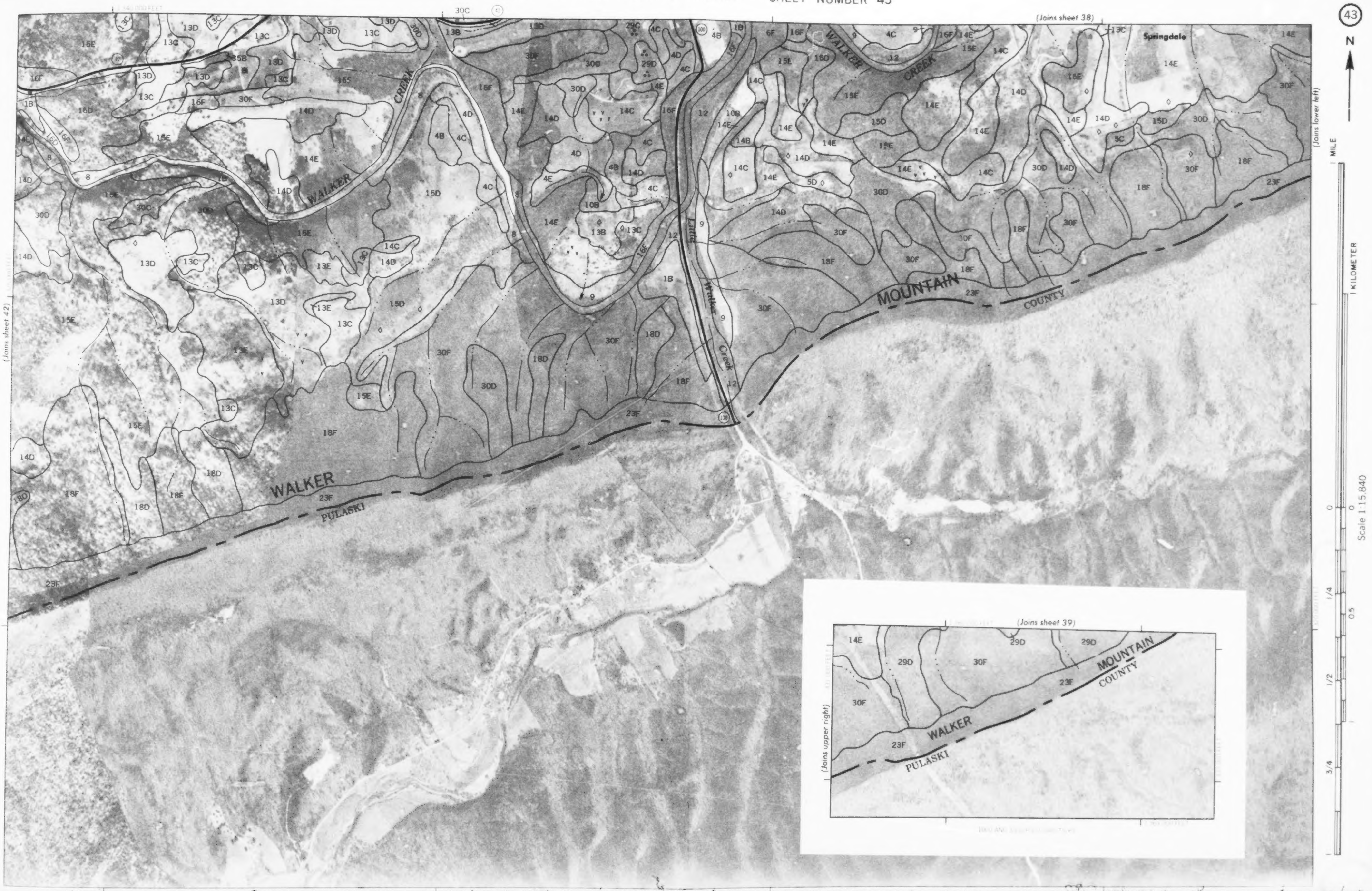

41
(Joins sheet 36)
(Joins inset, sheet 13)
(Joins sheet 42)
N
JEFFERSON NATIONAL FOREST
BRUSHY MOUNTAIN
BLAND COUNTY
STATE FARM
FLAT HOLLOW
22D
22F
17D
27F
27E
20E
20C
18F
17C
17F
5D
13C
13D
13E
15C
15D
15E
16F
35B
35C
14B
14C
14D
14E
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 42


42
N
(Joins sheet 37)
(Joins sheet 41)
(Joins sheet 43)
JEFFERSON NATIONAL FOREST
JEFFERSON NATIONAL FOREST BOUNDARY
BRUSHY MOUNTAIN
WALKER CREEK
White Gate
FLAT HOLLOW
WALKER MOUNTAIN
PULASKI COUNTY
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5

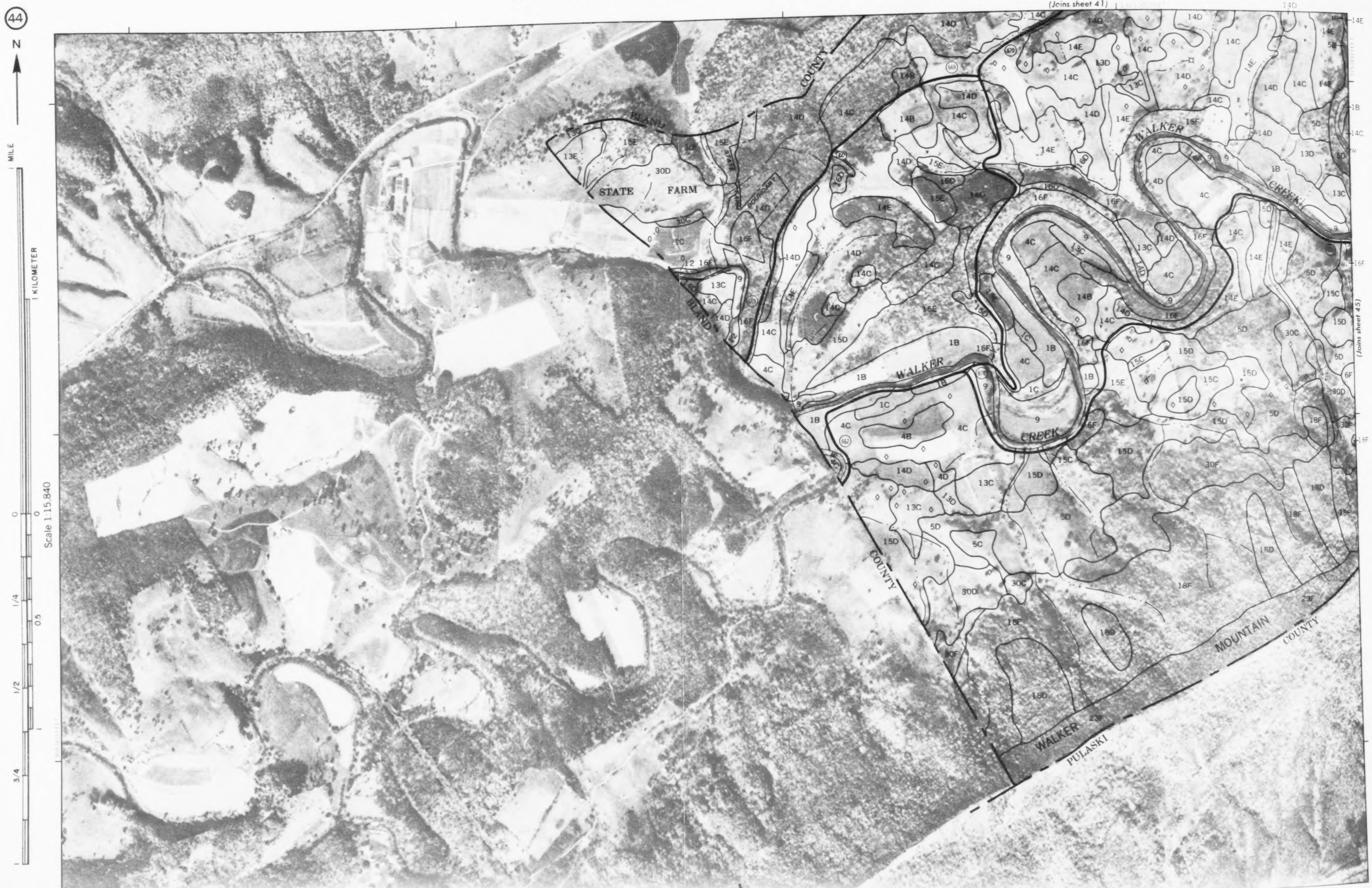
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. [illegible] photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 43


43
N
(Joins sheet 38)
(Joins sheet 42)
(Joins lower left)
(Joins sheet 39)
(Joins upper right)
Springdale
WALKER CREEK
Little Walker Creek
WALKER MOUNTAIN
PULASKI COUNTY
100
30C
13C
13D
15E
16F
30F
14D
14E
18F
23F
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 44

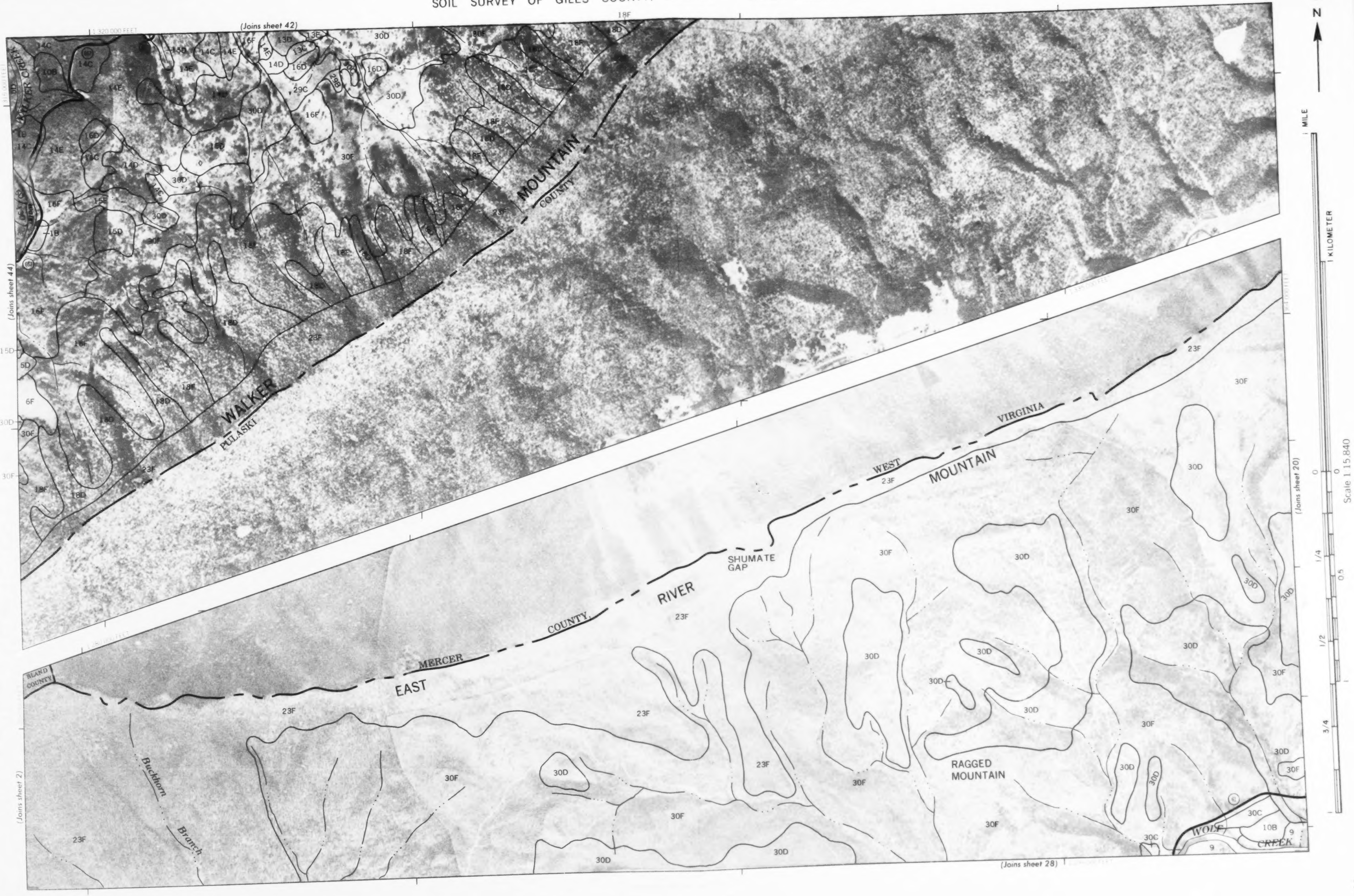


44
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
(Joins sheet 41)
(Joins sheet 45)
BLAND
COUNTY
STATE FARM
STATE
BOUNDARY
WALKER CREEK
WALKER MOUNTAIN
PULASKI COUNTY
1B
1C
4B
4C
4D
5C
5D
6F
9
12
13C
13D
13E
14B
14C
14D
14E
15C
15D
15E
15F
16D
16F
18D
18F
23F
30C
30D
30F

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

GILES COUNTY, VIRGINIA NO. 44

SOIL SURVEY OF GILES COUNTY, VIRGINIA — SHEET NUMBER 45


(Joins sheet 42)
(Joins sheet 44)
(Joins sheet 20)
(Joins sheet 28)
(Joins sheet 2)
1 320 000 FEET
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5
1
Scale 1:15 840
WALKER MOUNTAIN
PULASKI COUNTY
WALKER CREEK
EAST RIVER MOUNTAIN
MERCER COUNTY
WEST VIRGINIA
BLAND COUNTY
SHUMATE GAP
RAGGED MOUNTAIN
Buckhorn Branch
WOLF CREEK
14C
14D
14E
13D
13E
16D
16F
18D
18F
1B
10B
5D
6F
15D
16F
29B
29C
23F
30C
30D
30F
9

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps controlled photomosaics prepared from 1978 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.